

**STAKEHOLDER ANALYSIS FOR MONARCH BUTTERFLY AND POLLINATOR CONSERVATION IN  
OAKLAND COUNTY PARKS**

by

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## Executive Summary

The North American Monarch butterfly (*Danaus plexippus*) population has declined by 90% in the last twenty years. Scientists cite a number of factors for their decrease, including changing pesticide use, weather, and habitat loss. In December 2014, the negative trend prompted the United States Fish and Wildlife Service to initiate a status review of the Monarch butterfly under the Endangered Species Act.

Given their relatively large land-holdings in developed landscapes, parklands could serve as important habitat for Monarch butterflies and other pollinators. Park management and interpretive strategies can help shape public attitudes about the environment. This study uses stakeholder analysis to research perceptions and priorities for addressing pollinator conservation at Oakland County Parks and Recreation (OCPR). OCPR manages 13 parks encompassing 6,701 acres, including 3,146 acres of natural areas in southeastern Michigan. This research answers the following questions to assist OCPR in implementing conservation actions that appropriately engage internal and external stakeholders.

1. Who are the stakeholders involved with Monarch butterfly and pollinator conservation in Oakland County?
2. What is the extent of current Monarch butterfly and pollinator conservation both internally and externally?
3. What are external stakeholder perceptions for OCPR's priorities in Monarch butterfly and pollinator conservation?
4. How can stakeholder values and interests be integrated into program design for an Oakland County pollinator conservation plan?
5. How do local park efforts relate to national conservation programs?

The methods section reviews stakeholder theory and its application in natural resource management and program design. Past research indicates that stakeholder actions can be coordinated in ways to maximize the efficacy and efficiency of a system. Through an analytical categorization, stakeholders were segmented to show their relationship to the goal as well as their available resources to appropriately coordinate actions to achieve conservation objectives across the entire Oakland County park system. Assessing stakeholder power and influence revealed latent opportunities for enhanced communications and coordination.

Data was collected through semi-structured phone interviews with internal and external stakeholders in regards to their knowledge, perceptions and priorities. Internal stakeholder interviews included ten staff persons across OCPR departments. External stakeholders included 12 representatives from pollinator conservation organizations at the local, state and national levels. Transcribed interviews were coded and ranked to reveal common themes in rationale, management strategies, and barriers that informed the analysis.

Results indicate that many pollinator actions are in place, yet OCPR could coordinate them more purposefully through a cross-functional team to address education, management and communication facets of conservation issues. In addition, many external stakeholders lacked awareness of OCPR's current pollinator management efforts. This reveals an opportunity for OCPR to lead by example through a two-year communications campaign around Monarch conservation to educate and drive public interest in natural resource management.

Establishing new Monarch habitat rated highly among all stakeholders. They also thought parks played a critical role in public education and as a demonstration site. Results ranked the following stakeholder priorities highest: creating new habitat by seeding naturalized areas or no-mow zones with milkweed; certification of butterfly gardens, bioswales and other appropriate plantings as Waystations; training and encouraging park patrons to engage in conservation actions at their home; and continuing the North American Butterfly Association count and expanding citizen science efforts.

Lastly, this research reveals opportunities at a national-level to engage parks in meeting conservation objectives through a voluntary environmental program around establishing habitat and public education. This study suggests that developing a "Monarchs in the Parks" certification program through the National Recreation and Parks Association (NRPA) will multiply outreach efforts and habitat creation to engage parks in taking action to achieve conservation outcomes to meet objectives of the North American Monarch Conservation Plan.

## **Acknowledgements**

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## Table of Contents

STAKEHOLDER ANALYSIS FOR MONARCH BUTTERFLY AND POLLINATOR CONSERVATION IN OAKLAND COUNTY PARKS .....	
I. Introduction .....	1
II. Study System .....	5
A. Oakland County Description .....	5
B. Cultural & Natural Resources.....	6
C. Oakland County Parks and Recreation Resources .....	8
III. Methods .....	9
A. Stakeholder Theory.....	10
B. Stakeholder Analysis in Natural Resource Management & Program Design .....	11
C. Stakeholder Selection & Questions .....	13
IV. Results.....	18
A. External Stakeholder Descriptions & Interview Themes .....	18
B. Internal Stakeholder Descriptions & Interview Themes.....	30
C. Integrated Stakeholder Results.....	36
V. Discussion and Recommendations .....	39
A. Cross-Department Collaboration.....	39
B. Communications Plan .....	41
C. Stakeholder Roles and Action Plan .....	45
D. Study Limitations& Suggestions for Further Research .....	53
E. North American Monarch Conservation Plan.....	54
F. National-level Implications for Pollinator Management at Parks.....	57
G. Summary of Recommendations .....	59
Appendix A. Pollinator Conservation Resource List.....	65
Appendix B. IRB Approved Introductory Email and Interview Guide .....	66
Appendix C. Communications Strategy Matrix .....	69

## List of Tables

Table 1. External Stakeholders Interviewed.....	16
Table 2. Oakland County Parks and Recreation Staff Interviewed.....	16

Table 3. Questions Used For External Stakeholder Interviewed.....	17
Table 4. Questions Used For Internal Stakeholder Interviews.....	18
Table 5. Monarch Joint Venture Program/Project.....	21
Table 6. Monarch Watch Program/Project.....	21
Table 7. Monarch Lab Program/Project.....	22
Table 8. Wild Ones Program/Project.....	22
Table 9. Michigan Butterfly Network Program/Project.....	23
Table 10. Michigan Natural Features Inventory Program/Project.....	23
Table 11. Michigan State University Program/Project.....	24
Table 12. Detroit Zoological Society Program/Project.....	24
Table 13. SEMBA Program/Project.....	24
Table 14. North Oakland Land Conservancy Program/Project.....	25
Table 15. OCPR Program/Project.....	25
Table 16. ITC Holdings Corp. Program/Project.....	25
Table 17. Importance Themes from External Stakeholders.....	27
Table 18. Strategy Themes from External Stakeholders.....	29
Table 19. Barrier Themes from External Stakeholders.....	30
Table 20. Current OCPR Management and Outreach Activities for Monarch Butterflies & Pollinators....	32
Table 21. Internal Stakeholder Suggestions For Ocpr Management And Outreach Activities For Monarch Butterflies and Pollinator Management.....	33
Table 22. OCPR Staff Awareness of External Monarch Resources.....	34
Table 23. Internal Stakeholder Importance Themes.....	36
Table 24. Internal Stakeholder Barrier Themes.....	37
Table 25. Priority Scenario 1: Integrated External and Internal Stakeholder Suggestions and Resources.....	48
Table 26. Priority Scenario 2: Integrated External and Internal Stakeholder Suggestions And Resources.....	50

Table 27. Priority Scenario 3: Integrated External and Internal Stakeholder Suggestions And Resources.....	51
Table 28. NAMCP Goals and Objectives Related To Oakland County Parks.....	56

## List of Figures

Figure 1. Monarch Butterfly ( <i>Danaus plexippus</i> ) on New England Aster.....	2
Figure 2. Map of Michigan with Oakland County Highlighted.....	6
Figure 3. Powesheik Skipperling ( <i>Oarisma powesheik</i> ).....	8
Figure 4. Locations of Oakland County Parks in Oakland County, Michigan.....	9
Figure 5. Venn Diagram Showing Nested Relationships and Engagement Levels of External Stakeholders for Monarch Butterfly and Pollinator Management at OCPR Parklands.....	20
Figure 6. Venn diagram showing similarities and differences in perceived barriers by internal and external stakeholders towards pollinator conservation in Oakland County Parks.....	38
Figure 7. Power and Influence Matrix of Internal and External Stakeholders.....	39
Figure 8. Cross-Department Work Team to Address Pollinator Conservation Management and Outreach at OCPR.....	41
Figure 9. Power and Influence Matrix of Internal and External Stakeholders with Communications Platforms.....	46

## I. Introduction

The Monarch butterfly (*Danaus plexippus*) population has declined by 90% in the last twenty years (USFWS, 2015). In 2013, observers estimated a 44% reduction in the overwintering Monarch butterfly population in Mexico (WWF, 2013). Scientists cite a number of factors in their decline, including changing pesticide use, weather, and habitat loss (Brower et al., 2012). In particular, lower Milkweed plant numbers (*Asclepias spp.*) in their summer breeding habitat contributes to the decrease (Pleasants & Oberhauser, 2013); Monarch butterflies require this species to complete their life cycle. Genetically Modified (GM) crops that dominate U.S. agricultural production also play a role in habitat loss; this technology supports the practice of broadcast application of glyphosate herbicide that decreases Milkweed and nectar plant availability in Midwestern agricultural fields (Taylor, 2014). In addition, land development has removed nearly 17 million acres of suitable habitat (Taylor, 2014). Brower et al. (2012) even questioned the long-term prospects for the North American migration. In December 2014, the mounting evidence of population decrease prompted the United States Fish and Wildlife Service (USFWS) to initiate a status review of the Monarch butterfly under the Endangered Species Act (USFWS, 2014).

Pollinators contribute nearly \$24 billion dollars to the U.S. economy per year in ecosystem services (The White House, 2014). Many people perceive the Monarch butterfly as the charismatic “spokes-insect” for all pollinators who suffer from similar habitat deficits and threats; as a result its prominence has grown in pollinator conservation agendas. In March 2014, a dozen major newspapers published news stories about Monarch population declines. A recent household survey found that people would be willing to spend \$4 to 6 billion to support



Monarch conservation as an indirect ecosystem service benefit (Diffendorfer et al., 2013). The federal government announced \$3.2 million in investment for Monarch butterfly conservation through a partnership between the USFWS and the National Fish and Wildlife Foundation in February 2015 (USFWS, 2015). Clearly the Monarch's salience is growing in conservation agendas.



Figure 1. Monarch Butterfly (*Danaus plexippus*) on New England Aster (Hansen, 2011)

Given attention paid to this issue, the question remains – how does public interest and funding turn into tangible activities that improve survivability and prospects for Monarch butterflies and other pollinators? And, how do you measure progress? Parks could be important refugia for pollinators in an otherwise uncertain landscape of agricultural production and land development. Many organizations identify parklands and residential yards as opportunities to establish supplemental habitats. Planting appropriate plant species to support pollinators provides opportunities for education and engagement on a critical and timely conservation

issue. For example, the University of Kansas Monarch Watch program certifies “Waystations” to engage citizens in active conservation through native plantings.

Moreover, creating Monarch butterfly habitat has multiple conservation benefits beyond increasing diverse insect populations. Native Midwestern plants more efficiently absorb stormwater than shallow-rooted species, contributing to water quality improvement goals and restored hydrology (Whittinghill, Rowe, Andresen & Cregg, 2015). Citizen participation in educational volunteer opportunities increases awareness and support for local environmental issues such as land-use planning, natural areas protection and watershed management. Ryan, Kaplan and Grese (2001) found that stewardship volunteers have an increased appreciation and value for local natural areas, suggesting that park volunteer activities build constituency for broader natural areas protection.

Numerous organizations and universities work on Monarch butterfly conservation internationally. In 2008, the Commission for Environmental Cooperation (CEC) produced the North American Monarch Conservation Plan (NAMCP). The *North American Agreement on Environmental Cooperation* established the CEC in 2008; the agreement expresses the cooperation of Canada, Mexico and United States to protect and restore the environment, including wildlife (CEC, 2008). The NAMCP coordinates initiatives to maintain healthy Monarch populations and habitats throughout the flyway connecting all three countries (CEC, 2008).

While the NAMCP is a broad program, success is about individual people making changes on the landscape to benefit butterflies. Effective conservation likely requires many small-scale actions across the entire Monarch butterfly migratory flyway (Taylor, 2014). Given

their relatively large land-holdings in developed landscapes, parklands could serve as important habitats for Monarch butterflies and pollinators. Park management and interpretive strategies may help shape public perceptions of the environment. Although NAMCP recommendations and Monarch conservation are systematic, on-the-ground activities vary with individuals, resources and contexts. Projects may, or may not, be tracked through programs conditional on involvement with established citizen science, tracking or certification programs.

Given the need and opportunity presented by Monarch butterfly and pollinator conservation, Oakland County Parks and Recreation (OCPR) is interested in a systematic evaluation of stakeholders and recommendations to produce a plan that coordinates actions to support Monarch butterfly and pollinator conservation. OCPR manages 13 parks encompassing 6,701 acres that includes five golf courses, two waterparks, two campgrounds, two nature centers, and three dog parks in southeastern Michigan. Recommendations from this study address OCPR's interest in developing a model of best management practices in park management that appropriately engages internal and external stakeholders in pollinator conservation according to their priorities. My research will answer the following questions:

1. Who are the stakeholders involved with Monarch butterfly and pollinator conservation in Oakland County?
2. What is the extent of current Monarch butterfly and pollinator conservation both internally and externally?
3. What are external stakeholder perceptions for OCPR's priorities in Monarch butterfly and pollinator conservation?

4. How can stakeholder values and interests be integrated into program design for an Oakland County pollinator conservation plan?

5. How do local park efforts relate to national conservation programs?

OCPR will use this research to coordinate with stakeholders to undertake specific actions that reflect priorities, opportunities and capacities on their lands. The strategy for analysis and recommendations resulting from this research could apply to park settings throughout the United States.

## **II. Study System**

### **A. Oakland County Description**

Oakland County is located in southeastern Michigan approximately 20 miles northwest of Detroit. The 2010 U.S. census lists a population of about 1.2 million people, ranking 32nd in population of all U.S. counties (OCPR, 2013). It includes 30 cities, 21 townships, and 11 incorporated villages that vary in urban, suburban and rural character. The southeastern portion of the county is more densely urbanized. Significant development along the state and federal highway system exists throughout the county. Northern portions of the county are primarily suburban and rural. The primary county land use in 2011 was single family residential (OCPR, 2013).

Oakland County government is a leader in natural resources planning. In 2009, they produced a green infrastructure vision for the county that outlined opportunities at multiple scales: landscape, community and project to preserve hubs, sites and links within the county. They define green infrastructure (Advantage Oakland, 2009) as follows:

Green Infrastructure is an interconnected network of open spaces, natural areas, and waterways. The main focuses are on conservation values, the services provided by natural ecosystems, and integrating them into the built environment. Not all Green Infrastructure projects have the same goals and each project may include a variety of land types containing a mixture of ecological values. If you live, work, or play within Oakland County, you are a stakeholder when it comes to Green Infrastructure. From saving money, adding recreational opportunities, attracting businesses, and providing wildlife habitat, Green Infrastructure creates a framework for sustaining a wide-ranging quality of life (p.2).

Specifically, the plan lists urban projects as opportunities to connect with the green infrastructure vision, including rain gardens, green buildings, stream buffers, native landscaping, and restoration opportunities as examples for suburban and urban landscapes. Encouraging residents to establish Monarch butterfly Waystations complements this initiative within the native landscaping category to build greener infrastructure in Oakland County.



Figure 2. Map of Michigan with Oakland County Highlighted (Wikipedia, 2015)

## **B. Cultural & Natural Resources**

Oakland County is abundant in cultural and natural resources. There are 21 nationally registered historic districts, over 200 individual historic sites and 31 local historical museums

(OCPR, 2013). The headwaters of five major river systems that drain to the Great Lakes, the Clinton, Flint, Huron, Rouge and Shiawassee Rivers, originate in Oakland County. In addition, the County supports 29 different natural communities, 19 of which are wetlands (Albert, 2008). The diversity and quality of wetlands is unique given the county is the second-most populous in the state at over 1.2 million people (Michigan Senate, 2013). Comer et al. (1993) found that the county had lost 46% of its wetlands overall by the mid-1990s. While development pressure waned in the 2008 recession, Southeast Michigan Council of Governments (SEMCOG) predicts continuing population growth in northern Oakland County through 2040 (SEMCOG, 2012).

In Michigan, over 50 species of butterflies and moths are listed as endangered, threatened, or of special concern (MNFI, 2015). Six rare butterfly species occur in Oakland County including, Swamp Metalmark, Wild Indigo Duskywing, Persius Duskywing, Powesheik Skipperling, Blazing Star Borer and Regal Fritillary (MNFI, 2015). The USFWS recently listed Powesheik Skipperling as a federally endangered species; records indicate its presence in natural areas adjacent to Oakland County parklands.



Figure 3. Powesheik Skipperling (*Oarisma powesheik*) butterfly at Prairie Coteau SNA, Pipestone County, Minnesota. (Selby/USFWS)

### C. Oakland County Parks and Recreation Resources

As previously noted, Oakland County Parks and Recreation manages 13 parks encompassing 6,701 acres, including 3,146 acres of undeveloped natural areas. Developed park areas comprise five golf courses, two waterparks, two campgrounds, two nature centers, and three dog parks. Of particular relevance to this project are the Wint Nature Center at Independence Oaks County Park and Red Oaks Nature Center at Red Oaks County Park. O CPR's role is to provide recreational opportunities to Oakland County residents, as described in its mission statement:

The Oakland County Parks and Recreation Commission is dedicated to providing quality recreation experiences that encourage healthy lifestyles, support economic prosperity, and promote the protection of natural resources. (OCPR: Chapter 1, 2013 p. 1)

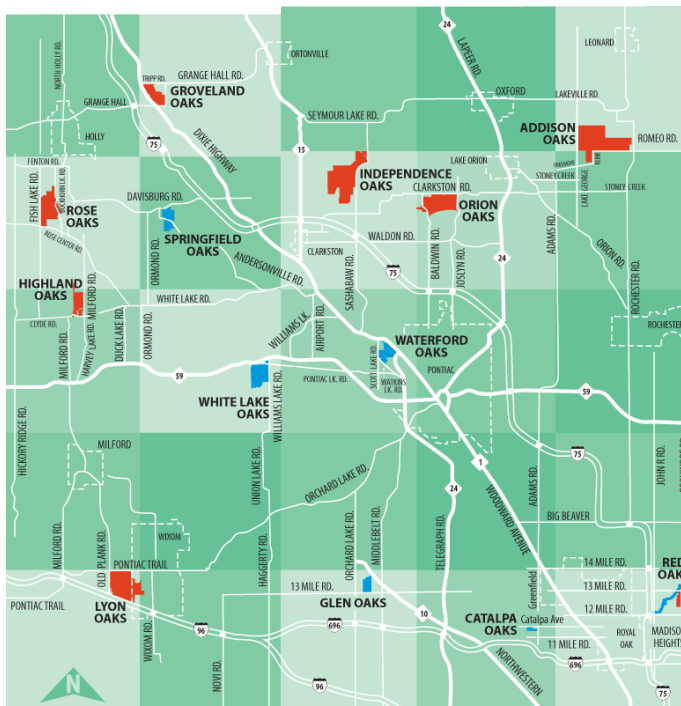


Figure 4. Locations of Oakland County Parks in Oakland County, Michigan (OCPR, 2013)

OCPR is funded by a quarter-mill tax on property located in Oakland County, as well as through fees, grants, donations, and other income sources. They provide services within the geographic boundaries of Oakland County, however all county visitors are welcome to take part in park activities (OCPR, 2013). Staff carefully plan services to complement local recreational authorities or by other private, non-profit, or larger regional and state providers and are designed to serve a diverse population of residents. The Parks Commission also collaborates with other units of government and organizations to manage open space and natural areas and provide recreational facilities and programs on an inter-community, county, and a regional (multi-county) basis (OCPR, 2013).

OCPR is currently operating under a Five-Year Parks and Recreation Master Plan (2013-2017) to guide parks and recreation services to Oakland County residents. The plan aims to improve the social, environmental and fiscal responsibility of the parks system. The plan's fundamental goal is to "...increase public participation in Oakland County Parks and Recreation while increasing cost-recovery organization-wide" (OCPR: Chapter 1, 2013, p.1). The planning process garnered input from the public, Parks Commission and 50 staff members. The master plan has four key areas of interest: Land and Natural Resource Management, Recreation Facilities, Recreation Program and Services, and Organizational Sustainability.

### **III. Methods**

I use stakeholder analysis (SA) to investigate how OCPR can coordinate natural areas management, education, administration and external partners to increase pollinator habitat and awareness given current barriers and opportunities. SA uses a number of methods to



understand an individual's interest and influence on a particular policy. Data collection methods include surveys, focus groups, workshops and meetings; chosen approaches depend on a project's goal and research questions (Reed et al., 2009). In closely reviewing this particular study system and actors, I seek to understand how to build human collaborations to restore pollinators; this could inform similar organizations to apply insights on a broader scale. In using stakeholder analysis to inform program design, two principles guided my approach as expressed by the authors below:

1. In regards to the benefits of surveys, Schumann states (2002), "...Asking questions continues to be an effective way of acquiring information of all kinds, assuming of course that the person answering is able and willing to respond accurately" (p.40).
2. According to Bryson (1995), "The key to success in the public and non-profit sectors – and the private sector too, for that matter – is the satisfaction of key stakeholders" (pg. 70).

## **A. Stakeholder Theory**

Stakeholder analysis emerged from the field of management. Freeman (1984) defined the stakeholder as "... any group or individual who can affect or is affected by the achievement of a corporation's purpose," (p.46) and he played a pivotal role in bringing SA theory to application through his publication *Strategic Management, A Stakeholder Approach*. The central concept is that an organization's success is affected by stakeholders, and understanding the interests and influence of those individuals can inform management strategies to meet the firm's strategic objectives (Varvasovszky & Brugha, 2000). In this context, SA intends to inform decision-making, mitigate risk, or accelerate project development.

Accounting for stakeholder roles and values can improve program design and efficacy by assessing their interest and influence on an issue (Luyet, Schlaepfer, Parlange & Buttler, 2010). Grimble and Wellard (1997) further define SA as “...a holistic approach or procedure for gaining an understanding of a system, and assessing the impacts of changes to that system, by means of identifying the key actors or stakeholders and assessing their respective interests in the system” (p. 175). This definition implies that stakeholder actions can be coordinated in ways to maximize the efficacy and efficiency of a system.

Organizations have applied SA in variety of ways related to improving decision-making in international development. Policy makers use SA to understand the dynamics of the interest and influence of stakeholders on a particular policy and its advancement. Reform efforts in healthcare have used SA to advance policy changes by understanding stakeholders. For example, the *Latin American and Caribbean Regional Health Sector Reform Initiative* created a toolkit applying SA to understand political context to facilitate changes in public health policy (LACHSR, 2000). SA has been particularly useful for international sustainable development projects to coordinate stakeholder participation in aid programs (ODA, 1995).

## **B. Stakeholder Analysis in Natural Resource Management & Program Design**

Stakeholder analysis has been identified as an important strategy to manage natural resources (Grimble & Wellard, 1997). Incorporating multiple perspectives into planning efforts improves conservation outcomes through gaining local support for management actions (De Lopez, 2001). Research by Lute & Gore (2014) on wildlife management demonstrates that

stakeholder analysis “can help improve management effectiveness that balances top-down and bottom-up approaches” (p. 1060).

SA has improved protected areas management in international parks. For example, Corbett National Park in India investigated SA as a tool to incorporate stakeholder perspectives in conservation planning (Rastogi, Badola, Hussain & Hickey, 2010). Similarly, SA findings informed a work plan to reach conservation objectives by understanding local supporters and detractors of conservation goals in Ream National Park, Cambodia (De Lopez, 2001).

Managers have applied SA in a variety of contexts to guide involvement for citizen input on environmental decision-making (Hage, Leroy & Petersen, 2009). Evidence demonstrates stakeholder involvement enhances decision-making due to more comprehensive inputs (Reed, 2008). For example, Burkardt and Ponds (2006) examined role analysis for stakeholder involvement as an effective way to gain citizen involvement in managing Grizzly Bears in Wyoming. Watershed management planners have also used SA to understand different values and priorities (Kontogianni, Tziritis & Skourtos, 2005; Kaplowitz & Witter, 2007).

I used an instrumental, or pragmatic, approach in the analysis that seeks to explore how the actors can work together to produce conservation outcomes within their respective park or agency positions. Determining who needs, or wants, to be involved, and when and how that involvement can most efficiently be coordinated, informs a successful pollinator conservation plan for OCP. In addition, understanding external stakeholder views is critical to deciding whether or not to pursue partnerships. As Reed et al. (2009) notes, “It has been argued that stakeholder analysis can enable information and perspectives to be sought from a far wider

range of sources, providing a more robust knowledge base from which to build the development or natural resource initiatives” (p. 1936). This is particularly important for a government agency that wants to take into account priorities and knowledge of those with whom they serve and collaborate.

A variety of SA approaches are available to researchers and program managers, they include analytical categorizations, stakeholder relationship models (i.e. Social Network Analysis), and reconstructive categorizations (Reed et al., 2009). Given my need to specifically identify stakeholder’s interests’ and capacities’ in designing an appropriate program, I used an analytical categorization to understand how to engage stakeholders for instrumental ends (Reed et al., 2009). My methodology mirrors the process outlined by the United Kingdom’s Overseas Development Administration (ODA) that offers the following steps as summarized by Grimble and Wellard (1997, p.187):

1. Draw up a list of stakeholders
2. Draw out stakeholder interests in relation to problem addressed
3. Assess the influence or power of the stakeholder
4. Assess the importance or need to satisfy the stakeholder
5. Combine influence or importance in a matrix diagram
6. Identify risks and assumptions for stakeholder cooperation
7. Determine how and which stakeholders should participate in project cycle activities

In following the ODA approach, I categorized stakeholders to show their relationship to the goal as well as their available resources to appropriately coordinate actions to achieve conservation objectives across the entire Oakland County park system.

### **C. Stakeholder Selection & Questions**

Given the wide variety of SA applications across disciplines, definitions vary of who qualifies as a stakeholder according to context. Research by Billgren and Homen (2008) outlines different approaches to identifying project stakeholders; they argue that varying definitions affect whether those with less power have input on programs and projects. My analysis embraces the definition provided by De Lopez (2001) for natural resource management projects: “A stakeholder is any group or individual who can affect achievement or is affected by achievement of a conservation project’s objectives” (p. 48).

The identification of stakeholders was critical to the success of my research. I conducted 22 interviews with key stakeholders with internal actors and external organizations related to butterfly conservation at the local, state and national levels for data collection, see Tables (1-2). OCPR staff selected the initial group of stakeholders both internal and external; additional stakeholders were interviewed by recommendation from an interviewee. Furthermore, I used personal experience from attending “Make Way for Monarchs: A Janet Meakin Poor Research Symposium” at the Chicago Botanic Garden on June 6, 2014 and the University of Minnesota North American Monarch Institute educator training July 14-16, 2014 to identify salient national-level organizations that connect to this investigation.

External stakeholders interviewed included scientists, volunteers and staff from non-profit organizations related to pollinator conservation. Nationally, multiple organizations engage this issue, however they did not all have an Oakland County thread based on interviews or personal research and are not included; see Appendix A for a comprehensive listing.

I conducted interviews with individuals employed by Oakland County Parks in the interpretation, natural resource management, business development, communications and park management to assess internal priorities and capacities. Key OCPR staff encouraged fellow staff participation through personal communications. They also made an announcement introducing the study in November 2014 via email to make staff aware of potential contact.

I selected semi-structured phone interviews as the qualitative data collection method. This approach allowed for conversation and open-ended questions, yet limited impacts on work schedules. All participants received an email to give background on the study and to gain consent and availability to conduct a phone interview within the research time frame (see Appendix B). Interviews lasted from 15 minutes to one-hour. The Duke Institutional Review Board approved the research design, data collection methods, and questions for compliance with their human subjects research protocol on October 28, 2014. Interviews were conducted by phone and recorded using a TASCAM Linear PCM Recorder and saved as digital files.

I transcribed the interviews for analysis to distill main points to assess an individual's interest and influence on developing a formal Monarch butterfly and pollinator conservation program. Common themes in rationale, management strategies and barriers were coded to inform the analysis and program recommendations; results reveal themes and priorities for future actions. Specifically, the coding reflects how many times a particular management action, or theme, was mentioned by stakeholders. I filed transcribed interviews into folders.

TABLE 1. EXTERNAL STAKEHOLDERS INTERVIEWED		
ORGANIZATION TYPE	AFFILIATION	TITLE/ROLE

<b>International NGO</b>	Monarch Joint Venture	Community Program Specialist
<b>National/Local NGO</b>	Monarch Watch	Local Conservation Specialist
<b>National Academic</b>	University of Minnesota Monarch Lab	Community Program Specialist
<b>National/Local NGO</b>	Wild Ones – Southeast Michigan & North Oakland Chapters	Volunteers
<b>State NGO</b>	Michigan Butterfly Network	Biological Research Director
<b>State Government</b>	Michigan Natural Features Inventory	Conservation Scientist
<b>State Academic</b>	Michigan State University	PhD Candidate, Dept. of Plant Biology and Ecology
<b>Local NGO</b>	Detroit Zoological Society	Curator of Birds
<b>Local NGO</b>	Southeast Michigan Butterfly Association	Past President, Co—founder, Author
<b>Local NGO</b>	North Oakland Headwaters Land Conservancy	Executive Director
<b>Local Government</b>	OCPR	Volunteers
<b>Local Private Firm</b>	ITC Holdings, Inc.	Customer Relations and Community Manager

**TABLE 2. OAKLAND COUNTY PARKS AND RECREATION STAFF INTERVIEWED**

<b>TITLE</b>	<b>DEPARTMENT</b>
<b>Natural Resources Planner</b>	Natural Resources
<b>Recreation Program Supervisor</b>	Recreation Program & Services
<b>Education Resource Specialist</b>	Recreation Program & Services
<b>Technical Aide</b>	Planning & Resource Development
<b>Parks Naturalist</b>	Recreation Program & Services
<b>Communications Specialist</b>	Marketing & Communications
<b>Parks Supervisor</b>	Parks Operations
<b>Recreation Specialist</b>	Recreation & Program Services
<b>Supervisor Marketing &amp; Communications</b>	Marketing & Communications
<b>Supervisor of Planning &amp; Resource Development</b>	Planning & Resource Development

To appropriately design a new program for OCPR, I asked questions to understand actors, their linkages, roles and interests. Internal and external stakeholders had separate question sets tailored to their role and context to the research questions. My goal through external interviews was to determine an individual’s background, recommendations for actions and priorities, perceived barriers, and understanding their role in pollinator conservation and how it could relate to a formal program for OCPR. Internal stakeholder interviews were conducted to understand their role within the agency, current actions related to Monarch

butterfly and pollinator conservation, subject area knowledge, recommendations for further actions, as well as barriers to conservation efforts.

To classify stakeholders for analysis, I defined stakeholders into primary (active) and secondary (passive) categories (Grimble & Wellard, 1997). Primary stakeholders are directly affected by a decision, and secondary stakeholders are intermediates in the organization that may have an indirect relationship with the activity (ODA, 1995). See tables (3-4) for interview questions.

<b>TABLE 3. QUESTIONS USED FOR EXTERNAL STAKEHOLDER INTERVIEWED</b>	
1.	Are you familiar with Monarch butterfly and pollinator conservation? If so, how?
2.	Do you think Monarch butterfly and pollinator conservation is important?
3.	On a scale of 1-7, where 1 means not at all interested and 7 means very interested, how interested are you personally in Monarch butterfly conservation efforts?
4.	In your opinion, should OCPR have a Monarch butterfly conservation program? Why or why not?
5.	Specifically, what role would you like them to play?
6.	What opportunities do you see for Monarch butterfly conservation within OCPR or a county park system in general? Should they focus on land management and creating more habitat or education and awareness?
7.	What barriers for do you see for Monarch butterfly conservation or pollinator conservation at a county park level?
8.	Are you currently involved with OCPR?
9.	If so, please describe your relationship with OCPR?
10.	Do you have other comments you would like to share about pollinator and Monarch butterfly conservation and land management practices at OCPR?

<b>TABLE 4. QUESTIONS USED FOR INTERNAL STAKEHOLDER INTERVIEWS</b>
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1. What are your duties/responsibilities within your organization?
2. Among your duties/responsibilities, what are your highest priorities within your position?
3. Do you see yourself in education/outreach/management/planning/business development or natural resource management, or maintenance, which category would you place yourself in?
4. Are you familiar or involved with best-management practices for pollinator conservation? They could include: <ul style="list-style-type: none"> <li>• No-mow zones</li> <li>• Rain gardens/bio-swales</li> <li>• Native plantings</li> <li>• Butterfly gardens</li> <li>• Invasive species removal</li> <li>• Mowing/burning schedules</li> <li>• Herbicide application</li> </ul>
If so, please describe how? Do you think they are important practices?
5. Are you familiar with the need for Monarch butterfly conservation?
6. Do you know of education and outreach programs at OCPR that include educating visitors about pollinator and Monarch butterfly conservation? An example would be an outreach program at a nature center.
7. Have you heard of pollinator or Monarch conservation efforts done by other agencies or groups? What do you think about other programs you may have heard about?
8. In your opinion, should OCPR have a Monarch butterfly conservation program? Why or why not?
9. What new opportunities do you see for pollinator-friendly conservation practices (that includes helping Monarch butterflies) within OCPR?
10. In your opinion, what are the benefits of a conservation program specific to Monarch butterflies within OCPR?
11. In your opinion, what are the biggest barriers for pollinator conservation in OCPR?
12. On a scale of 1-7, where 1 means not at all interested and 7 means very interested, how interested are you personally in Monarch Butterfly conservation efforts?
13. What can you do in your current position to support monarch conservation at OCPR?
14. Do you have other comments you would like to share about conservation and land management practices at OCPR?

## IV. Results

### A. External Stakeholder Descriptions & Interview Themes

External stakeholders include local groups as well as organizations active on the state and national platforms for Monarch butterfly and pollinator conservation. I classified stakeholders according to the scale of influence and closeness of partnership with pollinator management at OCPR, see figure 3. Local actors are considered primary given their direct contact with parks system, with varying levels of involvement. State-level actors have influence

in regards to research, programs and resources. National-level stakeholders provide resources, programs and leadership for conservation across the landscape of the lower 48 states of the United States. In Oakland County, both Monarch Watch and Wild Ones operate at both the national and community level given the presence of local staff and volunteers.

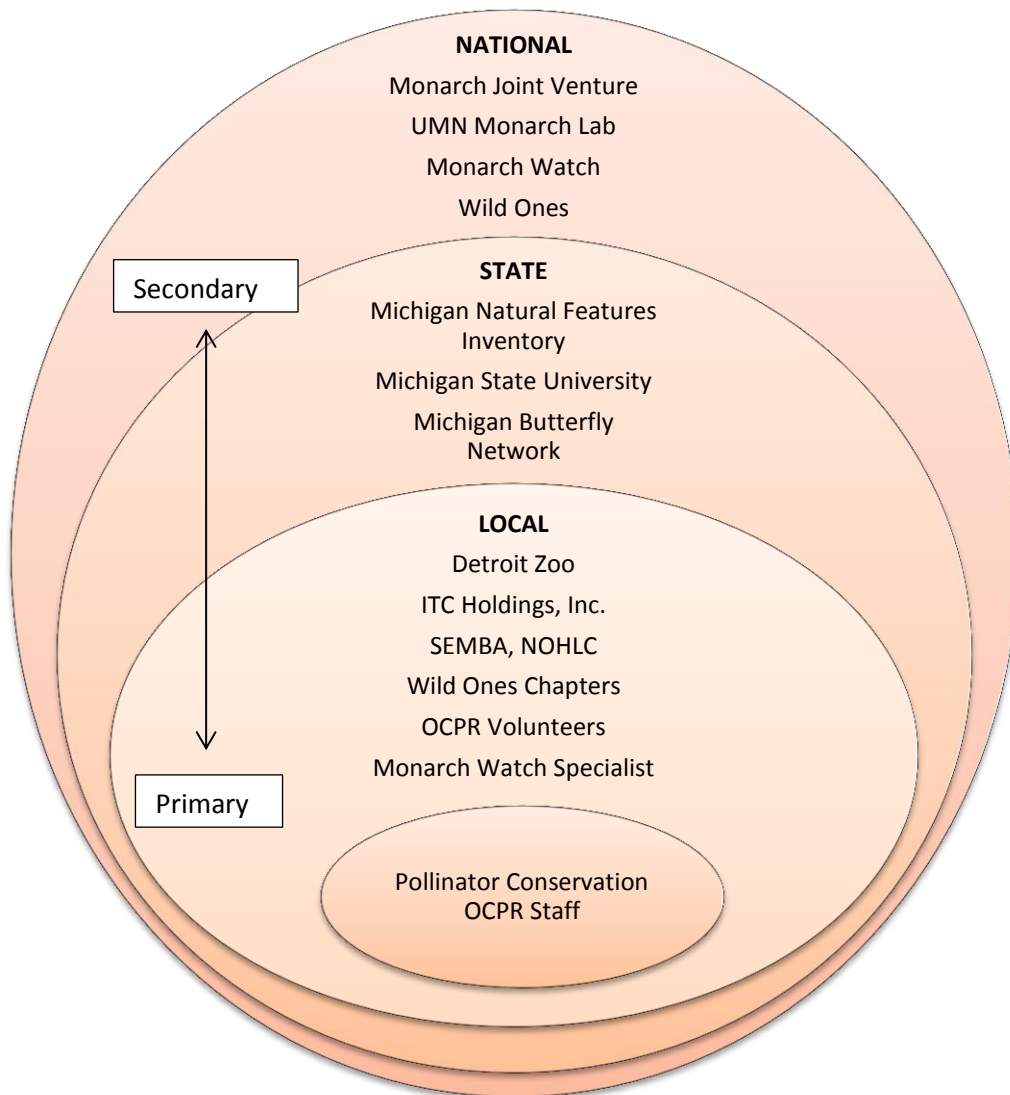


Figure 5. Venn Diagram Showing Nested Relationships and Engagement Levels of External Stakeholders for Monarch Butterfly and Pollinator Management at OCPR Parklands.

I describe external stakeholders through their organizational mission and their programmatic offerings as related to Monarch butterfly and pollinator management. The description provides information on the programs and resources in place that could support a program at Oakland County parks. Tables (5-16) describe in detail program and information offerings that could assist OCPR to sustain their current program and enhance it with external resources.

**Monarch Joint Venture (MJV)** is a national conservation organization that brings together conservation partners to do education, research, increase awareness and habitat conservation and enhancement to protect the Monarch butterfly migration in the lower 48 states.

TABLE 5. MONARCH JOINT VENTURE PROGRAM/PROJECT	DESCRIPTION
<b>Partnership Coordination</b>	The MJV coordinates federal agencies, state agencies, non-governmental organizations, and academic programs working to protect the long-distance migration
<b>Project Documentation</b>	Documents and promotes partner projects; offers an “Enter Your Habitat” feature to track smaller projects across a broad geography
<b>Website</b> <a href="http://monarchjointventure.org/">http://monarchjointventure.org/</a>	Gives guidance on involvement; biology; threats; and resources for Monarch conservation including webinars
<b>Website</b> <a href="http://www.plantmilkweed.org">www.plantmilkweed.org</a>	Information on planting appropriate species and sources for purchasing plants; promotes opportunities for milkweed plantings in gardens, managed corridors, agricultural areas, and natural and restored habitats

**Monarch Watch (MW)** is a nonprofit organization affiliated with the University of Kansas that conducts an education, conservation, and research program focused on the Monarch butterfly, its habitat, and its long-distance migration. It engages Conservation Specialists as regional outreach managers nationwide. Three specialists in southeastern Michigan serve the Great Lakes area and Northeast.

TABLE 6. MONARCH WATCH PROGRAM/PROJECT	DESCRIPTION
<b>Website</b> <a href="http://monarchwatch.org/">http://monarchwatch.org/</a>	Detailed information on Monarch life history; biology; rearing; University of Kansas tagging research and projects; butterfly gardening; resources; and online store
<b>Milkweed Market</b>	Identifies, educates about and sells milkweed species appropriate for a particular region
<b>Monarch Waystation Certification</b>	Encourages landowners to plant Milkweed and nectar species. Registers habitats in the International Monarch Waystation Registry; participants receive a certificate. A weatherproof sign identifies it as part of the Waystation registry.
<b>Bring Back the Monarchs Conservation Campaign</b>	A program to restore 20 milkweed species to their native ranges throughout the United States. It also encourages the planting of nectar-producing native flowers to support adult monarchs and other pollinators.
<b>Conservation Specialists</b>	Monarch Watch specialists are active with school programs and education efforts; including organizing the Monarch Butterfly Festival in Springfield Township held mid-August to engage families to learn about Monarch butterfly conservation. Presented in concert with Springfield Township Recreation Department, festival activities include Monarch tagging and live caterpillars, vendors, crafts, games, and workshops on butterfly gardens, native plants and raising Monarchs.

**University of Minnesota Monarch Lab (UMML)** targets teachers and students with curriculum and techniques to learn science and the process scientists use to understand nature.

TABLE 7. MONARCH LAB PROGRAM/PROJECT	DESCRIPTION
<b>Website</b> <a href="http://monarchlab.org/">http://monarchlab.org/</a>	Information on research; biology; rearing; ask-the-expert; publications and resources; conservation and an online store
<b>Monarch Larvae Monitoring Project (MLMP)</b>	Citizen science program that engages people in gathering and reporting information about the Monarch butterfly life cycle
<b>Education and Gardening</b>	Offer <i>Monarchs and More</i> curriculum for K-2, 3-6, Middle School and <i>Schoolyard Ecology Explorations</i> curriculum; professional development opportunities for educators; schoolyard Monarch gardening guidance, including a grant program; Insect Fair program that encourages the research process

**Wild Ones (WO)** is a national non-profit organization that promotes planting native plants in yards. It has local chapters across the United States that teach about native landscaping benefits through education, projects and advocacy. Two chapters in Oakland County serve the southeast and northern portions of the county.

TABLE 8. WILD ONES PROGRAM/PROJECT	DESCRIPTION
<b>Website</b> <a href="http://www.wildones.org/">http://www.wildones.org/</a>	Information on partnership, membership, resources for native landscaping, grant information,; and online store
<b>Wild for Monarchs</b>	Engages national membership and 50 local chapters to educate and advocate for Monarchs butterflies and the native plants that support them, executed in partnership with Monarch Joint Venture.
<b>Moving for Monarchs (M4M)</b>	Project that celebrates butterflies through music, dance, film and photography.
<b>Local Chapter Activities – Southeast and North Oakland Chapters</b>	Native Plant Sale at Red Oaks Nature Center and Native Plant Education Program at Wint Nature Center

**Michigan Butterfly Network (MBN)** is a state-wide butterfly monitoring project to track changes in Michigan’s butterfly species. Coordinated by the Kalamazoo Nature Center, it utilizes a network of hubs around the state of Michigan to gather data by trained volunteers.

TABLE 9. MICHIGAN BUTTERFLY NETWORK PROGRAM/PROJECT	DESCRIPTION
<b>Website</b> <a href="http://www.michiganbutterfly.org/Home.aspx">http://www.michiganbutterfly.org/Home.aspx</a>	Information on hub contacts, volunteer description, monitoring protocols, resources and data entry
<b>Monitoring Network</b>	Program to engage volunteers in monitoring butterfly populations within census routes and submit data yearly to track overall populations and diversity.

**Michigan Natural Features Inventory (MNFI)** is the state biodiversity and natural heritage data collection agency. Their staff of professional scientists collect, analyze, and communicate information for planning, protection, restoration and management of the state’s natural resources.

TABLE 10. MICHIGAN NATURAL FEATURES INVENTORY PROGRAM/PROJECT	DESCRIPTION
<b>Website</b>	Information on rare species and communities,

<a href="http://mnfi.anr.msu.edu/">http://mnfi.anr.msu.edu/</a>	resources, and publications
<b>Species Information</b>	MNFI tracks county element occurrences of rare butterflies on Oakland County; provides species descriptive abstracts of rare pollinators; offers targeted information for Mitchell's satyr conservation; pending grant to do state-wide bumblebee inventory in 2016

**Michigan State University Department of Plant Biology** is a world-class research group that does research on plant pollinator interactions, which includes Monarch butterflies and other pollinators.

TABLE 11. MICHIGAN STATE UNIVERSITY PROGRAM/PROJECT	DESCRIPTION
<b>Monarch Butterfly research</b>	Research project investigating the impact of summer mowing on Monarch butterfly populations.

**Detroit Zoological Society (DZS)** offers 125-acres of interpretive wildlife exhibits in Royal Oak, MI as well as the Belle Isle Nature Zoo in Detroit, MI. Their goals include demonstrating leadership in animal conservation and welfare, and to provide unique educational experiences to inspire stewardship of nature.

TABLE 12. DETROIT ZOOLOGICAL SOCIETY PROGRAM/PROJECT	DESCRIPTION
<b>Website</b> <a href="http://www.detroitzoo.org/">http://www.detroitzoo.org/</a>	Information on visiting the zoo, special events and animal conservation initiatives
<b>Karner Blue Butterfly Conservation Program</b>	Petersburg State Game Area habitat management and Karner Blue Butterfly propagation and release project to increase population of a federally endangered species.

**Southeast Michigan Butterfly Association (SEMBA)** is a non-profit education organization based in Westland, MI. Their mission is to educate about Lepidoptera, instill a passion for nature, and preserve the environment for butterflies, skippers and moths. Their past-president also offers *Brenda's Butterfly Habitat* at Barson's Greenhouse, which is a summer-only public butterfly house with Michigan native butterflies.

TABLE 13. SEMBA PROGRAM/PROJECT	DESCRIPTION
<b>Website</b> <a href="http://www.sembabutterfly.org/">http://www.sembabutterfly.org/</a>	Information on membership, meetings, surveys and resources
<b>Membership Program</b>	Offers monthly education program on some aspect of butterfly or pollinator ecology, organized volunteer projects and regular newsletters
<b>Brenda's Butterfly Habitat</b>	Michigan Native Butterfly house open during select hours in the summer. Allows visitors direct experiences with butterflies and opportunity to purchase native host plants.

**North Oakland Land Conservancy** is a land protection organization active in northwest Oakland County that conserves woods, fields, streams and other natural resources in the headwaters of the Clinton, Shiawassee, Huron and Flint River watersheds. They preserve over 1,400 acres of land in six townships and two counties.

TABLE 14. NORTH OAKLAND LAND CONSERVANCY PROGRAM/PROJECT	DESCRIPTION
<b>Pollinator Conservation Program</b>	Offering events to engage members to conserve pollinators through private land management and supporting NOHLC lands.

**Oakland County Parks & Recreation (OCPR) Volunteer Program** offers opportunities for residents to assist with a variety of citizen science, recreation and natural stewardship activities.

TABLE 15. OCPR PROGRAM/PROJECT	DESCRIPTION
<b>Volunteer Program</b>	Includes citizen science, nature center recreation and education, and natural resource stewardship activities
<b>Adopt-A-Garden Program</b>	Through a written agreement an individual, or group, assumes responsibility for the planting and maintenance of a garden bed located in Oakland County parks.
<b>Ernst Greenhouses at Waterford Oaks County Park (acquired 2009)</b>	Staff and volunteers have used greenhouse space to propagate bedding and native plants on a limited basis.

**ITC Holdings Corp. (ITC)** is one of the nation's largest independent electric transmission companies. Its headquarters is in Novi, Michigan, in southwestern Oakland County.

TABLE 16. ITC HOLDINGS CORP. PROGRAM/PROJECT	DESCRIPTION
<b>Integrated Vegetation Management Program</b>	Select removal of incompatible species with power lines; regular maintenance activities; promotes growth of grasses, wildflowers and low-growing shrubs.

Interview results reveal three major categories of interest or themes expressed by external stakeholders; they include rationale, strategies and perceived barriers. I present results in tables (17-19).

During interviews, stakeholders discussed importance of Monarch butterflies and pollinators and why OCPR might undertake programmatic activities. Three common reasons emerged from their perspectives: (1) concern over pollinator decline, (2) importance of education, and (3) habitat enhancement. The majority of interviewees shared the perception of the Monarch butterfly as a highly-charismatic, visible species for all pollinators or “show-girl”; for example, interviewees shared “The monarch is a flagship, and they have declined so rapidly, it’s a good time to begin a program,” and “Most people are interested in conservation but don’t know what to do, but they don’t want to see Monarchs destroyed. They are a good species for focus.” The loss of pollinators to support crop production was another priority concern, “The loss of pollinators affects the food system.” Some interviewees signaled the loss of pollinators as a barometer for environmental health, sharing “Pollinators are an indicator for the health of the planet.”

External stakeholder priorities bridged both education and management, one interviewee stated, “They [OCPR] have a role in conservation and education.” The majority of interviewees emphasized education as a necessary piece to effective conservation efforts and that a park system was a good mechanism to deliver that education to public audiences,



comments' included, "Yes, they should it [education] is one of the easiest ways to get people involved in ecosystems and the environment," "Education and awareness will promote tolerance for plantings and natural areas," and "They can especially help with delivering messages to the public."

In regards to habitat, a variety of concerns emerged from interviews. Most significantly, external stakeholders perceived the parks as playing a critical role as a public demonstration area for best-practices, "...community engagement to extend from the park to people's yards," and, "...Their actions can set a good example to the community. By sharing improvements and management they can educate the public." Some interviewees expressed concern over focus on just Monarch butterflies, "I think we should be studying Monarchs as well as other species. If we had been monitoring 10 or 15 years ago, we may have had a much better awareness of rare and common species, and what is really in trouble - what really worries me is how wetland butterflies are suffering." Overall, interviewees perceived that OCPR already provides quality habitat; for example, one interviewee shared, "the North Park of Independence Oaks has a population [Monarchs]," and some indicated support of OCPR's current natural resource management efforts.

**TABLE 17. IMPORTANCE THEMES FROM EXTERNAL STAKEHOLDERS, LISTED BY FREQUENCY OF MENTION**

TOPIC	THEMES
<b>Rationale</b>	<p><b>Pollinators in Decline</b></p> <ul style="list-style-type: none"> <li>• Monarch butterflies are a visible, "flagship" species to the public (5)</li> <li>• Concern for effective food production given pollinator decline (5)</li> <li>• Pollinators are an indicator species for environmental health (3)</li> </ul> <p><b>Education</b></p> <ul style="list-style-type: none"> <li>• Education is necessary for pollinator conservation (6)</li> <li>• OCPR is a good mechanism for public education/aligns with their mission and</li> </ul>

people trust park personnel (5)

**Habitat**

- OCPR can set example to the community, tell the natural resource management story and why they are doing what they do (6)
- Manage for all pollinators not just one species, for example wetland butterflies need greater protection than Monarchs (4)
- OCPR already provides important habitat (3)

External stakeholders recommended a variety of actions for OCPR to undertake. I segregated suggestions into the categories of outreach and natural resource management. A frequent comment was the park's role as a demonstration area, for example, "Also, more pollinator gardens with appropriate signage to educate and explain the types of 'weeds,' and interpret them to people." Many said that signage is a critical education piece, "...having interpretive signs is also important, to let visitors know what is going on and how they can help." This recommendation is consistent with recent research documenting the importance of signs to educate residents on the importance of rain gardens in the city of Portland, Oregon (Church, 2015).

Citizen science opportunities were important to external stakeholders, "Monarch Watch, MLMP and Monarch tagging are all great citizen science projects," and "The more people involved in research the better to understand their needs." In particular several stakeholders recommended leveraging citizen science activities to monitor restoration projects, "By setting up census routes through a restoration project area, can ensure monitoring the area. For example, do pre-monitoring and then when you plant the seeds or plugs for the next three years, have a volunteer return and monitor the area."

Other suggested strategies included educational programs and distribution of Monarch conservation materials to the public, “Pass out information on Monarchs to visitors and seeds for them to plant at their own homes.” Several stakeholders reinforced the importance of programs, “Education is important; applied to different groups in different ways. It could be seminars, for example that go over their life cycle, migration patterns, and concentrating on their needs for host plants and nectar sources. Also good for kids to see caterpillars close-up to make the connection between the caterpillar, chrysalis and butterfly with their own eyes.”

Land management techniques were of importance to external stakeholders, “For proper management, land managers need a scientific background to apply knowledge to management decisions.” In addition, partners mentioned invasive species management and seed source as factors in successful pollinator management. One interviewee commented “They also have native genotype plants there which can be hard to find, that is a good resource for propagating plants for the larval stage.” Black swallow-wort (*Cynanchum louiseae*) control was also mentioned.

**TABLE 18. STRATEGY THEMES FROM EXTERNAL STAKEHOLDERS, LISTED BY FREQUENCY OF MENTION**

TOPIC	THEMES
Strategies	<p><b>Outreach</b></p> <ul style="list-style-type: none"> <li>• Engage in citizen science projects with park visitors – MLMPP, Bumblebee Watch, MI Butterfly Network (5)</li> <li>• Waystation certification for OCPR projects, and encourage residents to plant milkweed and native wildflowers as nectar plants (4)</li> <li>• Signage important for people to understand plantings (4)</li> <li>• Pass-out information and seeds – MJV hand-outs for download and distribution (3)</li> <li>• Offer educational seminars on their life cycle, migration patterns and needs for host plants and nectar sources (4)</li> <li>• Offer professional development workshop for teachers through Monarch Teacher Network (1)</li> </ul>

**Management**

- Establish new native plantings with Milkweed and nectar plants and/ or supplement existing plantings with appropriate species (8)
- Use citizen science to gauge effectiveness of restoration projects or management actions (5)
- Review current burning and mowing practices and apply latest science to management decisions to reduce impacts to butterflies (2)
- Review pesticide use (1)
- Propagate native genotype plants from seed sources on park properties for plantings (1)
- More swallowwort control (1)

Perceived barriers by external stakeholders included: resources, staff, current practices, public interest, staff support, volunteer support, and adjacent land use. Many stakeholders felt a level of uncertainty in answering interview questions to advise OCPR. For example one commenter said in regards to their role to play, “Creating habitat, although I don’t know where they are from a budgetary standpoint.” Stakeholders largely acknowledged that, “Resources – people, time, money” were major barriers to a program. Constrained capacity was acknowledged in the park system as related to volunteers as well, “Maintaining habitat or gardens is dependent on volunteers, it is challenging to pull together volunteers to maintain gardens. Perhaps some gardens created for specific teaching purposes to prioritize.”

Another interesting barrier noted was public interest, one interviewee said, “Constant onslaught of commercial advertising, people are bombarded with consumption not conservation. The conservation message is low-key; it is also a voyage of self-discovery to overcome conventional thinking to make discoveries borne out of natural curiosity. It takes a paradigm shift in thinking and you can’t show it to people, they have to experience it.”

Another comment included, “Interest of the public. May not have compassion for the critter...What is the benefit to me?”

**TABLE 19. BARRIER THEMES FROM EXTERNAL STAKEHOLDERS, LISTED BY FREQUENCY OF MENTION**

TOPIC	THEMES
<b>Perceived Barriers</b>	<ul style="list-style-type: none"> <li>• <b>Money</b> - Limited park budgets (5)</li> <li>• <b>Staff</b> - Plantings cost money and need resources to maintain (4)</li> <li>• <b>Public Interest</b> – How will this benefit me? (3)</li> <li>• <b>Staff Support</b> - All staff may not support it if they are not familiar with natural resource management (3)</li> <li>• <b>Volunteer Support</b> – May not have enough volunteers to support an active program for monitoring or garden maintenance (3)</li> <li>• <b>Current Practices</b> - Conflicts with current management practices: herbicides, mowing, burning or mosquito control (2)</li> <li>• <b>Adjacent Land Use</b> - Controlling proximity and activity of nearby agricultural operations or landowner pesticide use (2)</li> </ul>

## B. Internal Stakeholder Descriptions & Interview Themes

All internal stakeholders interviewed fell within the primary category, as every OCPH employee had some direct relationship with pollinator management at the parks, albeit across different departments and activities. Even the Park Supervisor had a stake in programming and management through coordinating with staff and providing support for events and management. The Director level at OCPH falls within the secondary category; they have an indirect relationship with activities given their leadership, planning and management duties. I did interview the head of communications; the Executive Officer was not available, yet was aware of the investigation.

Internal stakeholders are classified according to their department and activities as they relate to pollinator management. Current activities undertaken by each department are listed in table (20). In addition, I list suggestions made by staff for further actions that would advance

conservation within OCPR as well as their awareness of activities undertaken by external agents.

The comprehensive list of current Monarch butterfly/pollinator management and outreach activities was generated from interviews with a variety of staff across departments, see table (20). Interestingly, it took multiple interviews across several departments to get a complete picture of all pollinator management activities. This indicates there was not a single source, or individual, that could provide all of the information listed in table (20).

**TABLE 20. CURRENT OCPR MANAGEMENT AND OUTREACH ACTIVITIES FOR MONARCH BUTTERFLIES & POLLINATORS**

DEPARTMENT	ACTIVITY
Recreation	1. Butterfly Gardens at Wint and Red Oak Nature Centers
Recreation	2. Integration of Monarch Butterfly and Pollinator content into nature education programs, including interpretive walks, family, library and school programs
Planning/Recreation	3. Monarch Watch Programs at Nature Centers
Planning/ Natural Resource Management	4. NABA Butterfly Count at Independence Oaks
Planning	5. Butterfly Checklist
Planning/ Natural Resource Management	6. Rare Insect Population Tracking, i.e. Tamarack Tree Cricket
Planning	7. Interpretive Signage (Spring 2015)
Planning	8. Weekly Nature Blog that has a Monarch butterfly focus a few times a year
Special Events	9. Butterfly Parade Special Event
Special Events	10. Butterfly 5K Run (Summer 2015)
Natural Resource Management	11. Bio-swales and Rain Gardens
Natural Resource Management	12. No-Mow Zones
Natural Resource Management	13. Grassland Restoration Projects
Natural Resource Management	14. Invasive Species Management
Natural Resource Management	15. Herbicide and Mowing Schedule sensitive to wildlife needs
Natural Resource Management	16. Prescribed burns done in mosaic patterns

Along with recording current activities, I asked for activity suggestions that would advance future pollinator management at Oakland County Parks. Staff identified a number of

actions that fit into their own role, or were related to key opportunities they saw for improvement. These opportunities broadly fit into the categories of education, management and communication, with crossover between. For example, new interpretive displays inside nature centers or kiosks could involve staff from Planning, Recreation and Communication Departments. Table (21) outlines staff suggestions for future activities.

**TABLE 21. INTERNAL STAKEHOLDER SUGGESTIONS FOR OCPR MANAGEMENT AND OUTREACH ACTIVITIES FOR MONARCH BUTTERFLIES & POLLINATOR MANAGEMENT**

DEPARTMENT	SUGGESTED ACTIVITY
<b>Recreation</b>	Monarch butterfly and pollinator education programs (in-house)
<b>Planning/Recreation</b>	More Monarch Watch programs at nature centers
<b>Planning/ Natural Resource Management</b>	Citizen Science projects related to Monarch butterfly tracking
<b>Planning</b>	Interpretive Signage
<b>Planning/Recreation/Communications</b>	Interpretive displays on Monarch butterflies and pollinators in the park inside nature centers or kiosks
<b>Planning/Communications</b>	Use Monarch butterfly conservation to motivate people to participate in stewardship activities
<b>Natural Resource Management</b>	Establish new bio-swales and rain gardens as appropriate to stormwater management needs, utilize milkweed in seed mix
<b>Planning/Natural Resource Management</b>	Certify appropriate plantings as waystations
<b>Natural Resource Management</b>	Expand No-Mow zones on Golf Courses and elsewhere, and seed with Milkweed
<b>Natural Resource Management</b>	Integrate pollinators and insects into park management plans
<b>Natural Resource Management</b>	Seed collection for Milkweed propagation and seeding new areas
<b>Natural Resource Management</b>	Review pesticide/herbicide practices, especially related to any use of neonictinoids
<b>Natural Resource Management</b>	Review mowing and burning BMPs with latest scientific research on Lepidoptera management
<b>Communications/Natural Resource Management</b>	Increase native plants in ornamental gardens for nectar
<b>Natural Resource Management</b>	Integrate pollinators and insects into park management plans
<b>Communications</b>	Internal communications about the subject through staff meetings and newsletters
<b>Communications</b>	Training for maintenance staff

I inquired about an individual's awareness of other activities done by groups to address Monarch butterfly and pollinator decline. Table (22) lists the partners/activities of which OCPR staff is aware. Staff was most aware of local partners with whom they have had direct contact with, specifically the Monarch Watch Conservation Specialist and Wild Ones chapter. In contrast, many national and state-level organizations appeared to be largely unknown, or not mentioned, during the interview.

TABLE 22. OCPR STAFF AWARENESS OF EXTERNAL MONARCH RESOURCES		
ORGANIZATION TYPE	AFFILIATION	CURRENT OCPR STAFF AWARENESS
<b>National/Local NGO</b>	Monarch Watch	Local Conservation Specialist programs and greenhouse activity as well as booth at OC farmer's market; Springfield Township Monarch Butterfly Festival (6)
<b>National NGO</b>	North American Butterfly Association	Annual Butterfly County (3)
<b>National/Local NGO</b>	Wild Ones – Southeast Michigan & North Oakland Chapters	Native Plant Sale at Red Oaks Nature Center (2)
<b>Local NGO</b>	Detroit Zoological Society	Karner Blue butterfly conservation work (2)
<b>Southeast Michigan Regional Recreation Agency</b>	HCMA	(1)
<b>State Government</b>	Michigan Natural Features Inventory	Want to contract with them for more pollinator studies, especially in fen habitats (1)
<b>National NGO</b>	Xerces Society	(1)
<b>Local NGO</b>	Southeast Michigan Butterfly Association	SEMBA Meetings and Butterfly House in Westland (1)
<b>Local NGO</b>	North Oakland Headwaters Land Conservancy	NOHLC has interest in connecting to public using Monarchs (1)
<b>Local Government</b>	OCPR	Partners with MSUE for Natural Shoreline Training for Homeowners workshop that advocates for native plants, i.e. Swamp Milkweed (1)
<b>Local Private Firm</b>	ITC Holdings, Inc.	Grant given to OCPR by ITC (1)
<b>State NGO</b>	Michigan Butterfly Network	No mention (0)
<b>National Academic</b>	University of Minnesota Monarch Lab	No mention (0)
<b>State Academic</b>	Michigan State University	No mention (0)
<b>International NGO</b>	Monarch Joint Venture	No mention (0)



In addition to data about activities done internally and externally, results from the internal stakeholder interviews revealed common themes about rationale and barriers, summarized in tables (23-24). In regards to importance and context for implementing a program, interview themes included pollinator decline, mission alignment, species charisma, positive organizational culture, holistic approach, and value of existing habitat. All staff commented on alignment of pollinator conservation to aspects of the OCPR mission, whether it is education or natural resource management.

All staff expressed awareness of pollinator decline: “Pollinators are a global issue for the food chain. We are a park system with greenspace. It is commensurate to consider pollinators in that system, just like herps, fish, birds, mammals, etc.” Another commented, “Yes, the species [Monarchs] is plunging fast. There are multiple threats here in the U.S. and Mexico.” In regards to an OCPR conservation program, an internal stakeholder shared “One challenge [with a formal program] is that in some ways it seems to be a demanding and unattainable goal.”

The appeal of the Monarch resonated with staff, “The Monarch has a special hook, people have an emotional connection to it, and there is a migration and tropical connection. It also receives a lot of press and public attention. Many people have actually seen or heard about it as an issue.” Another staff commented, “...The butterfly is pretty, and people pay attention to the butterfly and not the caterpillar. Adult monarchs are beautiful, and the caterpillar is not as obvious to people, they tend to focus on adult. Telling the story of what to do when everybody is focused on the flying adult is more complex for the public to understand; understanding the Milkweed is important and must be communicated.”

Internal stakeholders also expressed concern with managing for just Monarch butterflies and not all pollinators. They expressed that a holistic approach was appropriate to meet OCPR’s biodiversity mission and noted their current program is working, “The label ‘formal program’ is misleading versus efforts that are already going on...for example, all parks are now working to reduce pesticide use and manage for pollinators and flora and fauna.” Another internal stakeholder stated “...it should be standard best-management practices for all land management. Anything we do with mowing, herbicide that could affect pollinators should have great consideration.” Staff commented that the Monarch could be a “hook” to draw more volunteers and support for natural resource management at OCPR, “There also is a large capacity [for Monarchs] as a motivating force to engage people in stewardship activities.”

Lastly, it is worth noting that many staff shared positive comments towards natural resource management efforts at OCPR. For example, one staff said “I would like to share how proud I am...of the caliber of work staff does for natural resources, it is impressive. We are working towards a goal of preserving and managing natural communities for biodiversity,” and “I am really glad the OCPR has a natural resources department that values insect conservation. I am proud that we have such a good program, very happy.”

**TABLE 23. INTERNAL STAKEHOLDER IMPORTANCE THEMES, LISTED BY FREQUENCY OF MENTION**

TOPIC	THEMES
<b>Importance</b>	<ul style="list-style-type: none"> <li>• <b>Mission</b> - Aligns with OCPR mission of natural resource protection; OCPR has public visibility and education is critical (10)</li> <li>• <b>Awareness</b> – Staff understand issue that Monarch butterflies and pollinators are declining (8)</li> <li>• <b>Positive Organizational Culture</b> - Staff is proud of existing natural resource management and education efforts (8)</li> <li>• <b>Charismatic</b> - Monarch butterflies are attractive and relatable (5)</li> <li>• <b>Holistic Management</b> - Management should support all pollinators, not just one species (4)</li> </ul>

- **Efforts are Working** - Existing habitats are valuable to many wildlife species, including pollinators (3)

In regards to barriers to pollinator management, five common themes emerged from internal stakeholders: staff, resources, appearance, knowledge and leadership. Staff capacity was identified as the top barrier by everyone, a common comment was, “Time and staff ... we have limited hours and people.” Resources to plant and maintain habitat for pollinators was another impediment, “There is a challenge with maintaining plantings, who will maintain them? Working with contractors is expensive.” To a lesser degree, appearance, knowledge and leadership accounted for perceived barriers, one staff shared “There is a work-culture shift that is needed, which may be helped through training to gain enthusiasm. Need to provide some buy-in to see that native plantings are viable, and Monarch program could provide some ‘bang for the buck’ to see public interest for these planting projects.” Table (24) outlines top staff concerns.

**TABLE 24. INTERNAL STAKEHOLDER BARRIER THEMES, LISTED BY FREQUENCY OF MENTION**

TOPIC	THEMES
<b>Barriers</b>	<ul style="list-style-type: none"> <li>• <b>Staff</b> - Need more staff to do more programs or management actions (9)</li> <li>• <b>Resources</b> - Extra resources needed to maintain plantings, either by staff, volunteers, or paid contractors (6)</li> <li>• <b>Appearance</b> - Aesthetics of native plantings, many consider them “messy” (3)</li> <li>• <b>Knowledge</b> - Knowledge of the issue internally and externally (2)</li> <li>• <b>Leadership</b> - Support, especially considering how resources are distributed (1)</li> </ul>

### C. Integrated Stakeholder Results

Reviewing the Internal and external stakeholder results together shows both similarities and differences in perceptions, resources and priorities. For example, figure (5) shows similarities in perceived barriers by internal and external stakeholders towards pollinator conservation in OCPR. Both internal and external stakeholders share similar perceptions of barriers in regards to resources, staff, volunteers support and public interest. Yet they differed externally in that partners were not aware of the full-breadth of OCPR's science-based natural resources management efforts. In contrast, most external partners were not aware of the pressure staff felt in regards to how native plantings or naturalized areas may look to residents and their maintenance needs.

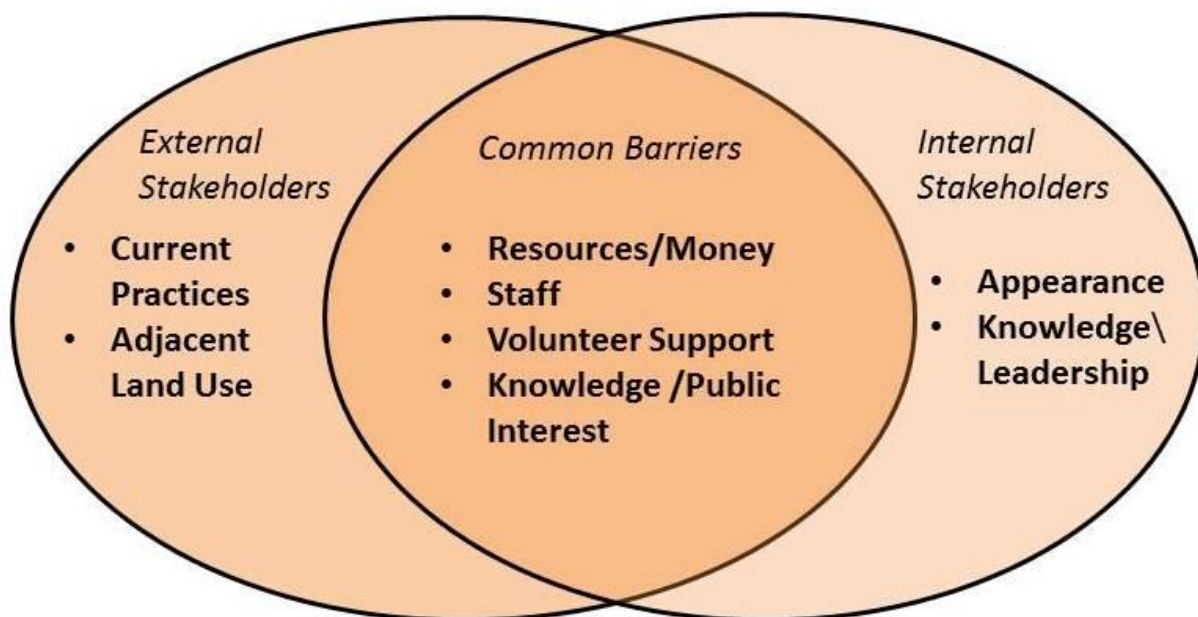


Figure 6. Venn diagram showing both similarities and differences in perceived barriers by internal and external stakeholders towards pollinator conservation in Oakland County Parks.

Stakeholders have different levels of power and influence over Monarch butterfly and pollinator conservation at OCPR. Figure (6) demonstrates the relationships between

stakeholders for communications and project planning. The organizations with a direct relationship with OCPR have the greatest power and influence on park management and outreach activities. They, along with operational staff, require a high-level of communications. Organizations that operate on a regional or national scale have high interest in conservation, but little power or influence on programming; they may not require regular communication. OCPR leadership and commissioners, as well as corporate partners, hold power over resources and goals but may have little interest in pollinator management depending on their knowledge, available resources and priorities. The public and organizations with a narrow focus have the least power or influence over how a pollinator management program evolves at OCPR.

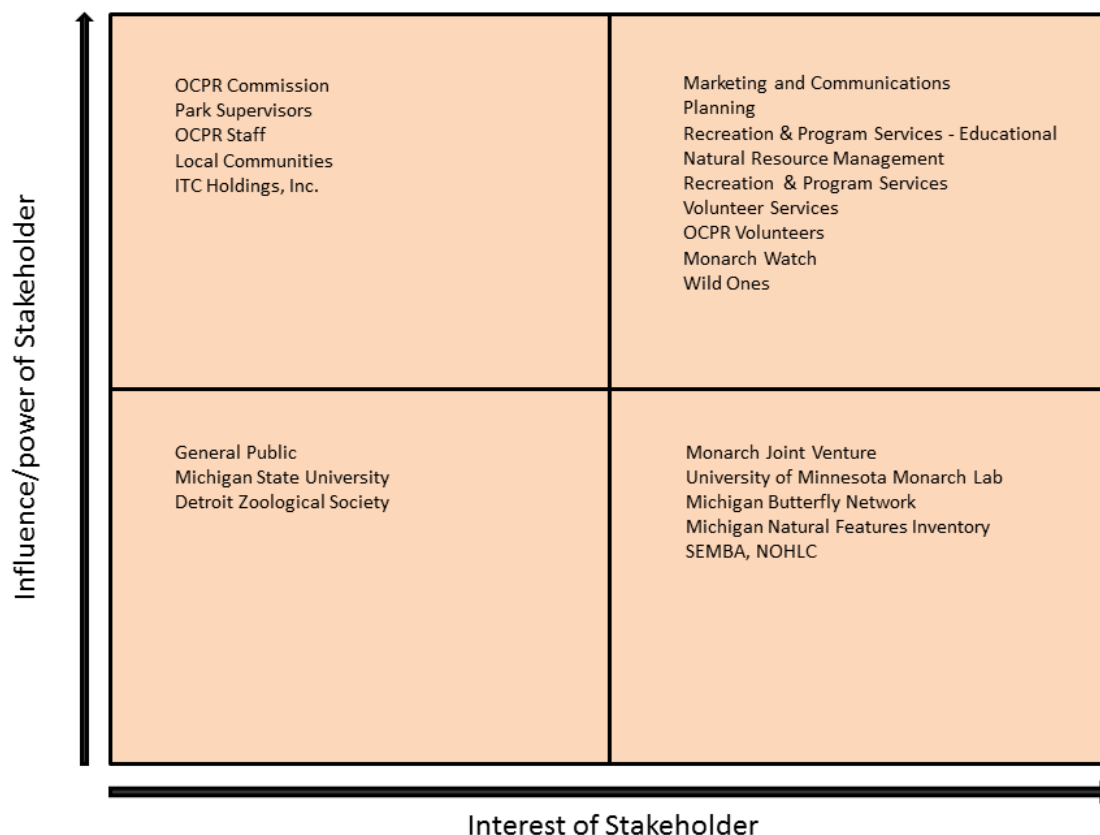


Figure 7. Power and Influence Matrix of Internal and External Stakeholders

- Power is defined by the amount of formal personal influence, or control, someone has to achieve the desired outcome (Chevalier, 2001).
- Interest is defined by the degree to which someone wants to be involved in a project or program.

## V. Discussion and Recommendations

### A. Cross-Department Collaboration

OCPR currently conducts 16 distinct activities that benefit monarch butterflies and pollinators on their parklands. Yet, interviews revealed that some staff were not aware of pollinator activities outside their own department.

These results indicate the need for communication across departments. A cross-functional team could address conservation issues holistically by sharing events, successes and information. This would allow

Creating a cross-functional team within OCPR to address a specific conservation issue aligns the education, management and communication facets of environmental problems.

OCPR to better track progress, communicate and share resources. The OCPR Strategic Plan (2013-2017) identifies leadership roles and collaborative relationships as key components to success. The plan presents “A Call to Action” (p.6) to collaborate across departments through work teams as a multi-disciplinary approach (OCPR: Chapter 9, 2013). Pollinator conservation is an opportunity to coalesce around an issue to expand and integrate cross-department actions towards a common goal. Coordinating activities combines capacities of multiple departments. This format could address other emerging conservation issues as OCPR moves ahead as a leader

in parks and recreation. Figure (7) presents a suggested framework to integrate OCPR Planning (BSD/P), Marketing and Communications (BSD/CM), Recreation and Program Services (RPS, IE and RPS/VS), Natural Resource Management (FOM/NR), and Park Supervisors (FOM/ND or SD) around a central theme.

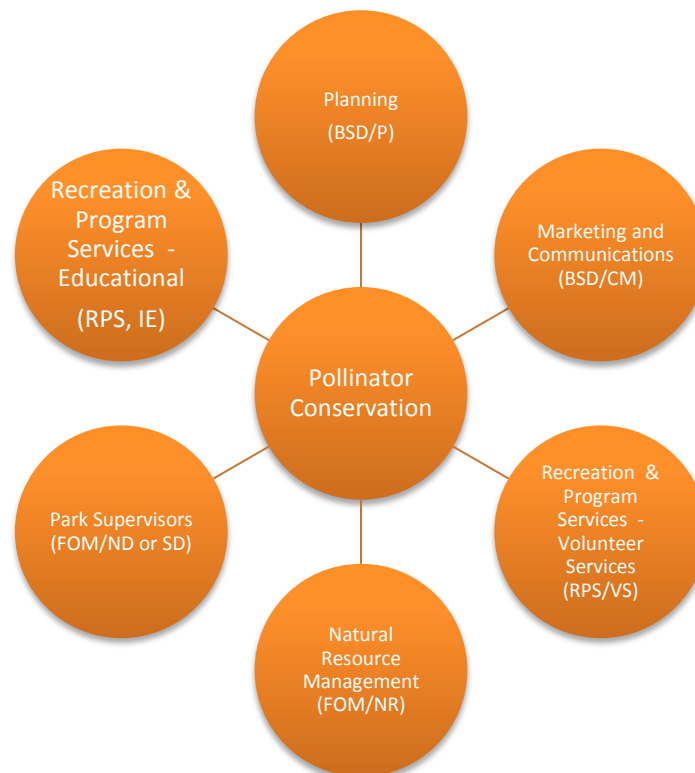


Figure 8. Diagram Showing Proposed Cross-Department Work Team to Address Pollinator Conservation Management and Outreach at OCPR.

External stakeholders felt strongly that appropriate habitat management at parks is a priority for successful pollinator conservation, yet they also expressed that parks played a critical role in public awareness. One external stakeholder shared, “The time is right for outreach. People trust park personnel. They are the perfect people and system to deliver information.” In addition, several external stakeholders recommended interpretation through park demonstration projects. An example: “They can organize outreach efforts around the

Monarch. To show the public, here is what I did and this is what you can do at home.” External stakeholders identified both education and land management as important for successful Monarch butterfly and pollinator conservation at a county park system level. This integrated prioritization reflects the need for conservation planning across different disciplines to effectively address the issue.

## **B. Communications Plan**

Interviewees cited lack of resources and staff as barriers to adding additional duties to their capacity. Given these limitations, it is unlikely that OCPR can significantly increase activities without additional staff or resources. However, they can meet public awareness goals by organizing a communications plan around current efforts to increase public awareness and educate staff on policies. This action promotes current efforts to maximize their public education value. These outreach efforts could increase public participation in natural resource management.

The overall goal of the communications plan is to invite stakeholders to participate in pollinator conservation efforts in a coordinated way to increase awareness and actions of employees, partners, and the public. In fact, some partners were not even aware of OCPR’s current pollinator and natural resource best-management practices, see figure (6). These results indicate the need to better communicate their actions to outside audiences. Furthermore, increased marketing

A centralized campaign around pollinators promotes current efforts and could drive public interest in broader natural resource management at OCPR.



around Monarch butterfly conservation efforts could increase public support for the entire natural resource management program.

Existing communication channels are an opportunity to reach both new internal and external audiences. The website in particular could be updated to include more precise information about their pollinator management efforts. Currently OCPR includes more general information about natural resources that does not appear to be linked to a specific conservation goal. Given this opportunity, I suggest the following objectives and metrics for a “Monarchs in the Parks” communications plan. Appendix C provides an integrated table of stakeholders, key messages and themes, communications platforms and metrics suggested, as follows.

### **Objectives and Metrics:**

#### **1. Increase employee awareness of pollinator management at OCPR:**

- Number of staff who can list examples of pollinator management conducted at parks to promote activities
- Number of staff participating in pollinator management activities through their role in the organization
- Number of appropriate staff trained on pollinator best-management practices
- An increase in resources directed towards natural resource management

#### **2. Increase public awareness of pollinator management at OCPR:**

- Number of people who visit natural resource management section of the website

- Number of emails sent to the list-serve related to pollinator management
- Number of social media posts and videos shared to promote activities and share

successes

- Number of newsletter and magazine articles related to pollinator conservation
- Number of local government agencies interested in duplicating OCPR

conservation actions

**3. Increase the number of people participating in educational programs:**

- Number of people attending educational programs
- Number of people who build butterfly gardens in their home landscape

**4. Increase the number of people participating in citizen science initiatives:**

- Number of people participating in monitoring programs

**Key Messages and Themes:**

Public Messages:

- OCPR conserves and restores habitat for Monarch butterflies and pollinators.
- Discover how you can help Monarch butterflies at your own home.
- Learn to monitor butterflies using citizen science at Oakland County Parks.
- Join us to learn about the miraculous migration of Monarch butterflies.
- Teach your children about the wonder of nature and science.
- Native plantings and restoration projects support the local food web and

pollinators.

### Staff Messages:

- OCPR conserves and restores habitat for Monarch butterflies and pollinators.
- You play an important role in managing natural resources at the park.
- Appropriate management techniques are important for pollinator conservation, especially using pesticides and mowing at parks.
- Native Milkweed and wildflowers in no-mow zones provide important habitat for Monarch butterflies.
- Native plantings and restoration projects support the local food web and pollinators.

### Organizational Messages:

- OCPR has a comprehensive two-year campaign to conserve Monarch butterflies and other pollinators through education and management.
- Local communities can support the Monarch conservation effort by using land management best-practices, increasing no-mow zones, planting Milkweed and nectar plants, and providing signage at butterfly gardens to educate the public.
- You can document your habitat at the Monarch Joint Venture website or through Waystation certification.

### **Communication Platforms:**

The following diagram presents appropriate platforms for each stakeholder group associated with the project. Since the goal is to move the individuals in the bottom-lower

quadrant to the right-hand side, a number of different communication channels should be used. In contrast, those already involved in the project will have more direct exchange through regular meetings and email communication.

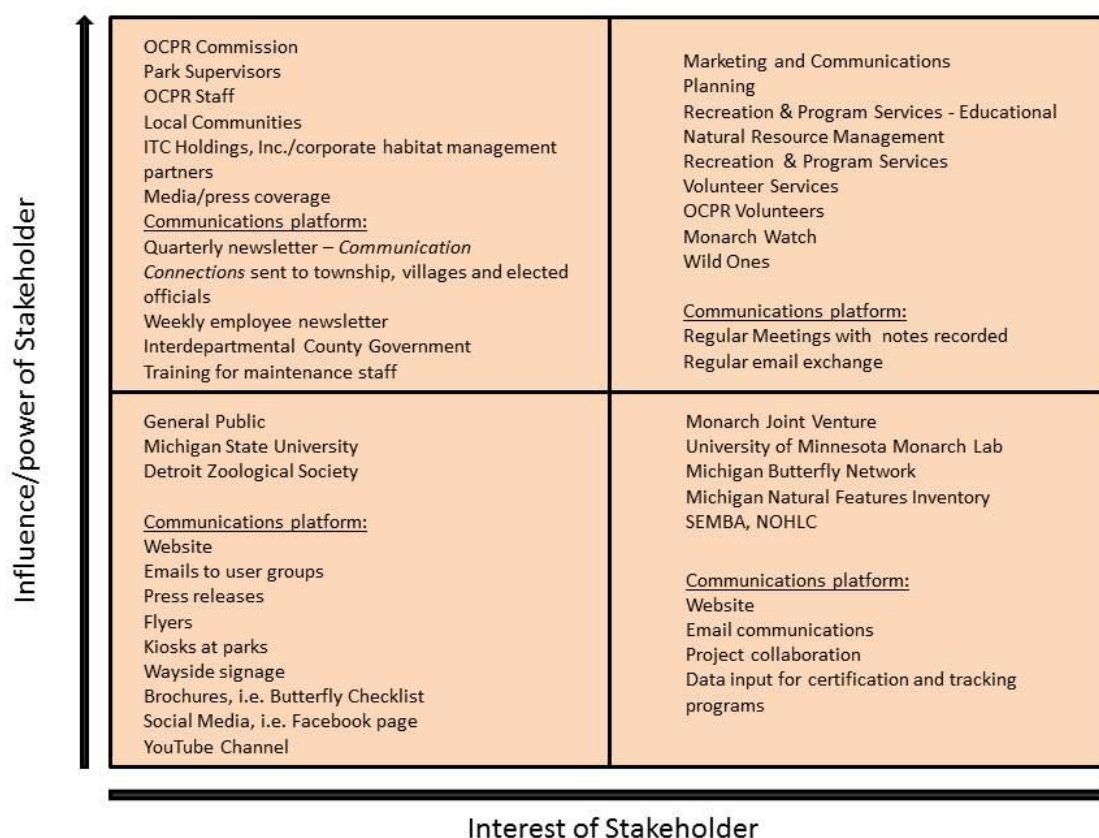


Figure 9. Power and Influence Matrix of Internal and External Stakeholders with Communications Platforms

### C. Stakeholder Roles and Action Plan

The input of stakeholders reveals a complexity of recommendations towards increasing Monarch conservation through a formal program, and addressing the needs of other butterflies of concern on their parklands. Six stakeholders (internal and external) expressed concerns with a pure focus on Monarch butterflies and felt that other species faced greater danger. For

example, the USFWS recently listed the Powesheik skipperling (*Oarisma poweshiek*) as endangered; OCPR is currently working with partners to address the needs of this species through coordinated conservation planning and co-management efforts in neighboring lands. Therefore, management principles should take into account the needs of rare butterflies – not to be eclipsed by Monarchs. For example, fen habitats should be managed for biodiversity endemic to that natural community to support the Powesheik Skipperling. Furthermore, real opportunity lies in enhancing the biodiversity of marginal areas for Monarch butterflies and restoring new areas as milkweed is not a difficult plant species to establish. As one staff commented, “Expanding no-mow or naturalized areas – especially golf courses could help. These areas could be seeded with milkweed and other pollinator plant species. Most of them have non-native species now...we could do seed collection and distribute to more areas in the park, they could be setup as Monarch Waystations.”

Training staff on specific management and education actions targeted around a goal would empower them to promote and participate in OCPR’s pollinator activities. For example, training park maintenance staff about mowing regimes appropriate to the Monarch butterfly life cycle would inform timing of management actions. Michigan State University research shows that mowing milkweed will not significantly impact milkweed plants availability to the larval stage if mowed between generations as they sprout back from perennial roots (Lisa Stelzner, personal communication, June 20, 2014). MLMP citizen science volunteers could report back fledgling time to staff to coordinate optimal summer mowing times for park edge areas.

As previously noted staff and resources are significant barriers to further OCPR activities for pollinator management. External stakeholder resources can seamlessly support current actions without creating a whole new programmatic workload. I present three different scenarios that prioritize actions based on stakeholder input that integrate resources and programs for OCPR. Scenario one activities were considered most important, and scenario three least important by stakeholders.

External stakeholder resources can seamlessly support current actions without creating a whole new programmatic workload.

Integrated results identify areas for further direction and collaboration for OCPR based on information and data gleaned from internal stakeholder current activities and suggestions for further actions and resources from external stakeholders. Tables (25-27) summarize suggestions for actions that align with opportunities to strengthen Monarch butterfly and pollinator conservation in the Oakland County Parks system based on stakeholder priorities.

**TABLE 25. PRIORITY SCENARIO 1(Most-Mention): INTEGRATED EXTERNAL AND INTERNAL STAKEHOLDER SUGGESTIONS AND RESOURCES**

DEPARTMENT	CURRENT ACTIVITIES	INTERNAL STAKEHOLDER STRATEGY SUGGESTIONS	EXTERNAL STAKEHOLDER STRATEGY SUGGESTIONS	EXTERNAL PARTNER RESOURCES	POTENTIAL ACTIONS
<b>Recreation</b>	Butterfly Gardens at Wint and Red Oak Nature Centers	Certify appropriate plantings as waystations	Waystation certification for OCPR projects; encourage residents to plant milkweed and native wildflowers as nectar plants to certify their own waystation	Waystation Certification through Monarch Watch	Certify butterfly gardens; bio-swales and other appropriate plantings as Waystations; hold a resident workshop on Waystation certification and butterfly gardening
<b>Planning</b>	Interpretive Signage (Spring	Interpretive signage	Signage important for	Certified waystations are	Supplement current planned

	2015)		people to understand plantings	eligible for Monarch Watch Signage	signage with Monarch Waystation signs and internally produced signs
<b>Planning/ Natural Resource Management</b>	NABA Butterfly Count at Independence Oaks; Rare Insect Population Tracking, i.e. Tamarack Tree Cricket	Citizen science projects related to Monarch butterfly tracking	Engage in Citizen Science Projects, such as MLMPP, Bumblebee Watch, MI Butterfly Network to encourage involvement and education about nature. Use MI Butterfly Network Monitoring Site to gauge effectiveness of restoration projects or management actions	Citizen Science Projects are available from multiple agencies. On a national level: MLMPP, Bumblebee Watch, and NABA Butterfly Counts; on a state level: MI Butterfly Network	Continue NABA count, establish a MI Butterfly Network census route at a restoration site, consider being the metro Detroit coordinator, offer training for citizens on MLMPP and Bumblebee Watch
<b>Natural Resource Management</b>	Bio-swales and Rain Gardens	New bio-swales and rain gardens as appropriate to stormwater management needs	Propagate native genotype plants from seed sources on park properties for plantings; certify appropriate plantings as waystations through Monarch watch	Waystation Certification through Monarch Watch	Certify appropriate stormwater management plantings as waystations through Monarch Watch
<b>Natural Resource Management</b>	No-Mow Zones	Expanding naturalized areas on Golf Courses and seeding with milkweed	Propagate native genotype plants from seed sources on park properties for plantings	Milkweed Finder website to locate regionally appropriate species	Seed naturalized areas with Milkweed and native nectar plants
<b>Planning</b>	Internal communications about pollinator conservation at OCPD (Cross-Department Communications)	Weekly Nature Blog that has a Monarch butterfly focus a few times a year	Internal communications about the subject through staff meetings and newsletters; Training for maintenance staff	Handouts available for download off MJV website on Monarch butterfly life cycle and appropriate milkweed	Provide regular updates at staff meetings and internal newsletters on pollinator education and conservation actions; train

	plantings	maintenance staff on pollinator biology and Monarch lifecycle
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**TABLE 26. PRIORITY SCENARIO 2 (Mid-Mention): INTEGRATED EXTERNAL AND INTERNAL STAKEHOLDER SUGGESTIONS AND RESOURCES**

DEPARTMENT	CURRENT ACTIVITIES	INTERNAL STAKEHOLDER STRATEGY SUGGESTIONS	EXTERNAL STAKEHOLDER STRATEGY SUGGESTIONS	EXTERNAL PARTNER RESOURCES	POTENTIAL ACTIONS
<b>Recreation</b>	Integration of Monarch Butterfly and Pollinator content into nature education programs, including interpretive walks, family, library and school programs	Monarch butterfly and pollinator nature programs at nature centers	Offer educational seminars on their life cycle, migration patterns and needs for host plants and nectar sources; Pass-out information and seeds	Lesson plans and content from the University of Minnesota Monarch Lab; Offer professional development workshop for teachers through Monarch Teacher Network	Offer additional programs on Monarch conservation to teach about the life cycle and conservation actions. Offer a teacher workshop on through the Monarch Teacher Network
<b>Planning/ Recreation</b>	Monarch Watch Programs at Nature Centers; Butterfly Checklist	Continue Monarch Watch Programs at Nature Centers; Interpretive displays on Monarch butterflies and pollinators in the park	Continue Monarch Watch Programs at Nature Centers; Make MJV informational flyers available to the public	Monarch Watch Conservation Specialist available; Handouts available for download off MJV website on Monarch butterfly life cycle and appropriate milkweed plantings	Continue Monarch Watch Programs at Nature Centers and other OCPR parks/events; Distribute MJV hand-outs at programs, nature centers and special events; develop an interpretive display on Monarch butterfly and pollinator conservation at OCPR for nature centers



<b>Special Events</b>	Butterfly Parade Special Event; Butterfly Tent with MI Native Butterfly Farm	Butterfly 5K Run (Summer 2015); Butterfly Tent with MI Native Butterfly Farm	Participate in Springfield Township Monarch Butterfly Festival	Handouts available for download off MJV website on Monarch butterfly life cycle and appropriate milkweed plantings	Consider having a OCPR staff person at the Monarch Butterfly Festival to promote natural resource management actions for pollinator conservation; distribute Monarch Joint venture information sheets at special events
<b>Natural Resource Management</b>	Herbicide and Mowing Schedule sensitive to wildlife needs	Review pesticide/herbicide practices, especially related to any use of Neonictinoids	Review pesticide use	Webinar on Neonictinoids provided via MNFI from the USFWS	Continue internal evaluation of pesticide use at OCPR and access new information available on Neonictinoids
<b>Natural Resource Management</b>	Prescribed Burns done in Mosaic Patterns	Integrate pollinators and insects into park management plans	Review current burning and mowing practices and apply latest science to management decisions	Michigan State University research on best management practices for mowing regimes for Monarch butterflies; MLMP resources on managing natural success for Monarch butterflies	Continue prescribed burns and invasive species treatment in mosaic patterns, consider supplementing grassland habitats with different species of Milkweed, for example, common and swamp milkweed

**TABLE 27. PRIORITY SCENARIO 3 (Least Mention): INTEGRATED EXTERNAL AND INTERNAL**

STAKEHOLDER SUGGESTIONS AND RESOURCES					
DEPARTMENT	CURRENT ACTIVITIES	INTERNAL STAKEHOLDER STRATEGY SUGGESTIONS	EXTERNAL STAKEHOLDER STRATEGY SUGGESTIONS	EXTERNAL PARTNER RESOURCES	POTENTIAL ACTIONS
<b>Natural Resource Management</b>	Grassland Restoration Projects	Seed collection for Milkweed propagation and seeding new areas	Propagate native genotype plants from seed sources on park properties for plantings		Propagate native plants at OCPR greenhouses for park plantings and distribute at nature centers and special events
<b>Recreation</b>	Adopt-A-Garden Program	Increase native plants in ornamental gardens for nectar	Propagate native genotype plants from seed sources on park properties for plantings	Plants lists targeted toward gardeners from MJV and Monarch Watch that are beneficial to pollinators and Monarch butterflies	Encourage Adopt-A-Garden volunteers to plant milkweed as appropriate to their adopted site; propagation of native plants at OCPR greenhouses for Adopt-A-Garden volunteers
<b>Natural Resource Management</b>	Invasive Species Management	Use Monarch butterfly and pollinator conservation to motivate people to participate in stewardship activities			Control invasive Black swallow-wort on parklands

## Goals and Metrics

Given these suggestions and resources, I suggest the following goals and metrics for Monarch butterfly and pollinator management at OCPR:

1. Increase the available habitat on OCPR lands for pollinators as appropriate to species, including the Monarch Butterfly.

- Number of acres of available habitat with milkweed species and nectar plants
- Number of acres available to rare butterfly species
- Number of public demonstration areas, which could include butterfly gardens/waystations and bioswales

2. Increase public awareness of conservation opportunities around the Monarch butterfly by promoting habitat management, citizen science education opportunities and demonstration areas.

- Number of programs conducted
- Number of volunteers engaged in citizen science
- Number of people trained on creating native gardens for pollinators
- Number of people (internal and external audiences) who receive communications around pollinator conservation at OCPR
- Number of interpretive signs

Since goals may or may not be achievable given current capacity, the scenarios (tables 25-27) prioritize opportunities as directed by stakeholders. Some pollinator management activities particularly fit well with grants to cover program start-up costs. I suggest the following activities for OCPR to pursue within a grant-funded project for a pollinator conservation using the Monarch butterfly as a flagship species to engage the public. For example, funds could be used for:

- part-time staff to track communications, program materials, program presentation, and conduct training for internal staff, citizen science trainings and possibly coordinate management efforts with staff;
- the development of an interpretive display for the nature centers and to travel to Oakland county libraries and local government offices;
- Waystation certification of all appropriate plantings to include butterfly gardens, now-mow zones, grassland areas, and bioswales, including additional signage as appropriate and to cover the certification fee;
- hosting a Monarch Teacher Network workshop or other professional development for teachers around pollinators;
- distributing native plant materials, either purchased or propagated at OCPR greenhouses; and,
- printing MJV literature to distribute at nature center or special events.

The National Fish and Wildlife Foundation recently launched a grants campaign in partnership with the U.S. Fish and Wildlife Service and the National Wildlife Federation to assist in the recovery of the Monarch butterfly (USFWS, 2015). Growing interest around the species may yield additional funding opportunities for OCPR.

#### **D. Study Limitations& Suggestions for Further Research**

While comprehensive in interviews and resource evaluation, the study has limitations in regards to breadth of interviewees. I did not have access to leadership such as the Executive Officer, Manager of Parks and Recreation, or Supervisor Parks and Recreation Planning. In

addition, interviewing OCPR Commissioners would provide insights on leadership perspective on conservation initiatives, which affects resource allocation. Interviewing maintenance staff would reveal their knowledge to inform training needs; they are largely part-time seasonal workers which make interviews difficult. Despite challenges, the staff interviewed for the study largely represents the perspective of on-the-ground practitioners responsible for project implementation – giving the research a strong grounding in programmatic reality and capacity.

Surveying Oakland County citizens to understand their interests and priorities for pollinator conservation would provide insights on messaging and engagement strategies, further clarifying the appropriate role for OCPR to play. It could also measure public awareness and gauge their interest in programs. Methods such as interviews of park patrons or an electronic survey to the OCCPR email list-serve could produce data. Specifically, a Knowledge-Transfer survey would define how visitors prefer to receive information and which news sources are most trusted for environmental knowledge (Archer, 2002).

## **E. North American Monarch Conservation Plan**

The NAMCP provides a blueprint for conserving Monarch butterflies across Canada, United States and Mexico to support their spectacular migration. It states that “habitat conservation and restoration are absolutely necessary for Monarch survival,” (p. 9) and focuses

Parks programs contribute to large-scale conservation efforts called for in the North American Monarch Conservation Plan.

on actions to provide appropriate wintering and breeding habitat (NAMCP, 2008). The plan offers a listing of key collaborative conservation objectives and actions to coordinate across a tri-national scale; many of their recommendations synchronize with current and future OCPR pollinator conservation activities. Scientific experts developed the plan over a series of trilateral workshops with broad stakeholder input; NAMCP’s content reinforces the validity of stakeholder priorities for Oakland County parklands.

Table (28) aligns local program opportunities with NAMCP objectives. Of particular note is the emphasis on citizen science and scientifically-researched management regimes. It also demonstrates the importance of parklands that offer protected areas for butterflies. These links show how OCPR, or any parks program, can add value to large-scale conservation efforts.

TABLE 28. NAMCP GOALS AND OBJECTIVES RELATED TO OAKLAND COUNTY PARKS		
NAMCP OBJECTIVE	NAMCP ACTION	LOCAL PROGRAM OPPORTUNITY
<b>Objective: Address the threats of habitat loss and degradation in the flyway</b>	Identify habitat types and locations that are essential for the migration (roosting sites and nectaring habitats.)	Current: OC Parks provides protected areas for monarchs
		Future: MLMPP monitoring; Identification of key habitats in the parks – grasslands and green infrastructure areas; follow appropriate mowing regime for management; restore new habitat for pollinators through new gardens or grassland restoration

<b>Objective: Address the threats of the loss, fragmentation, and modification of breeding areas</b>	Determine if, when and where milkweed is a limiting resource and develop plans to plant regionally appropriate species.	Current: OCPR provides protected areas for monarchs
		Future: Habitat restoration on parklands that includes Milkweed and nectar plants; encourage homeowners to plant milkweed and native wildflower species in their own yards to create habitat in suburban yards
	Strengthen monarch butterfly habitat protection on public and private land.	Current: OCPR provides protected areas for monarchs
	Develop road, powerline and railroad right-of-way habitat protection programs; promote protection in facilities such as golf courses or parks	Future: Enhance golf course buffer zones with milkweed species; habitat monitoring and management for Monarch butterflies; creation of new habitat.
<b>Objective: Limit impact of habitat management practices on monarchs, flowering plants and milkweeds</b>	Study and limit impact of biocides (herbicides, insecticides) on monarch population and their habitat.	Future: Review herbicide management applications to not impact milkweeds and supporting nectar plants
	Develop highway and other mowing regimens compatible with Monarch breeding	Future: Training for employees to recognize life cycle changes; mow in spring before arrival or fall after monarchs depart on migration
	Control dog-strangling vine and other invasive plants that directly affect Monarchs or milkweed.	Current and future: Continue and expand Black swallow-wort control and management
<b>Objective: Monitor monarch population, distribution, abundance and habitat quality, and utilize the monitoring data to understand monarch population drivers</b>	Develop shared monitoring toolkit with protocols linked to existing programs that address, breeding, migrating and overwintering	Future: OCPR can train visitors to participate in citizen science programs
	Determine the influence of topography, seasonal wind patterns and other landscape features on monarch movement	Future: OCPR can train visitors to participate in citizen science programs
<b>Objective: Evaluate and assess the effects of conservation actions on Monarch distribution and abundance</b>	Maintain a record of conservation actions	Future: OCPR submits documented habitats to MJV website for tracking; internally track actions on behalf of Monarch butterflies in management and outreach
	Collect and analyze existing data and use them to determine whether mitigation actions have been successful	Future: Use citizen science data to determine success of native plantings
	Develop adaptive management procedures to encourage factors	Future: Use citizen science data to determine success of native

	that result in positive changes and discourage those that result in negative changes	plantings and apply knowledge to future management and restoration actions
<b>Objective: Expand communication and information sharing that support Monarch conservation</b>	Develop, distribute and assess educational toolkit (including sensitivity to habitat values and management) to teachers, trainers and consumers.	Current: OCPR Monarch education programs for park patrons  Future: Continued Monarch Watch outreach programs with supplemented with OCPR interpretation
	Use electronic and print media for increasing awareness, distributed via and easy-to-use interactive website.	Future: Distribute MJV materials at nature centers and post in kiosks as appropriate; create links on OCPR website to Monarch butterfly education websites
	Create a factsheet and other communication materials on the Monarch Butterfly Flyway status and needs and distribute to decision-makers and communities	Future: Share Monarch conservation program with OC government and local communities via newsletter, and appropriate website links
	Develop and distribute consumer educational material (pollinator and Monarch friendly products).	Future: Create links on OCPR website to Monarch butterfly education websites
<b>Objective: Enhance capacity building, training and networking programs</b>	Develop and conduct training programs for natural resource professionals on using monitoring toolkit.	Future: Train park staff, as appropriate on Monarch life cycle and habitat management needs

Source: Objectives and Actions in above table (28) are excerpted from the NAMCP plan (CEC, 2008, p. 39-42).

## F. National-level Implications for Pollinator Management at Parks

My analysis of Monarch butterfly and pollinator management opportunities at OCPR has implications for parks management nationally since many parks agencies face similar opportunities and barriers. MJV indicated that, “We do have partners within MJV, such as the National Park Service working on a large-scale, then down to individual parks. Also working with the National Recreation and Parks Association (NRPA), focused on parks.” An article published by NRPA in their magazine posed the question – “Can Parks Help Save the Monarch?” (Dolesh, 2014). This reveals an interest in expanded partnerships with parks agencies to conserve Monarch butterflies.



In addition, NRPA recently offered a webinar “How Parks Can Save the Monarch” on January 15, 2015 in partnership with MJV. The webinar included MJV staff and a parks presenter that gave specific park project examples done on the Eastern U.S. coast. Furthermore, my analysis shows that OCPH is already conducting many actions that support the NAMCP and MJV objectives. These findings support an opportunity to broadly coordinate parks action with a voluntary environmental program to efficiently lead and coordinate activities towards established goals of Monarch butterfly conservation. Given the results of my analysis, I suggest the following criteria to certify a park involved with Monarch butterfly and pollinator management:

A Monarch butterfly conservation parks certification program can multiply outreach efforts and habitat creation to engage parks in taking action to achieve conservation outcomes in a purposeful way.

- Active citizen science monitoring program around Monarch butterflies at the park setting
- At least one native pollinator garden certified as a Waystation with appropriate signage
- Two public education programs per year, with at least one focused on establishing butterfly gardens in the home landscape
- One special event per year focused on pollinator conservation
- Documented effort to enhance current natural areas with Milkweed species
- Review and application of natural resource management practices in regards to herbicide, mowing and burning regimes for grasslands
- Track size and enter appropriate habitats into the MJV website habitat tracking feature

NRPA would lead this program through web-based certification management and educational support such as webinars, and could seek funds to cover start-up costs. Ideally, NRPA could sustain program administration by collecting a small certification fee to maintain a database of participating parks.

In summary, a certification program would encourage more parks to follow best-practices and conduct public education. It will also produce data to track success towards meeting NAMCP goals. It can multiply outreach efforts and habitat creation to engage parks in taking action to achieve conservation outcomes in a purposeful way. All landowners and gardeners can make a difference in Monarch butterfly populations through their land management techniques. A certification program will coordinate their efforts around that goal.

## **G. Summary of Recommendations**

Based on my analysis of stakeholder roles and interests, I present the following recommendations for a Monarch butterfly and pollinator management plan at OCPR.

### **OCPR Opportunities:**

- Create OCPR cross-functional team to address education, management and communication facets of specific conservation issues.
- Launch a two-year communications campaign around Monarch conservation to promote current and future efforts to educate and drive public interest in broader natural resource management at OCPR.
- Prioritize management and programmatic activities around stakeholder interests, as resources allow. Priorities from stakeholder data include:

- Scenario 1 (most-mention): Create new habitat by seeding naturalized areas or no-mow zones with milkweed; certify butterfly gardens, bioswales and other appropriate plantings as waystations; offer residential workshops on butterfly gardening and certification; utilize appropriate signage; continue NABA count and expand citizen science efforts such as MLMPP, MI Butterfly Network Route, or Bumblebee Watch.
  - Scenario 2 (mid-mention): Offer educational programs about life cycle and conservation actions; continue current Monarch watch offerings at nature centers; distribute MJV information and handouts at buildings and events; and continue internal evaluation of mowing, burning and pesticide use policies for pollinator health.
  - Scenario 3 (least-mention): Propagate native plants at greenhouses; encourage Adopt-A-Garden volunteers to plant milkweed; and control Black swallow-wort on parklands.
- Maximize use of stakeholder resources to reduce workload and develop partnerships to build local capacity around the issue.

In addition, my research also reveals opportunities at a national-level to engage parks in meeting conservation objectives through establishing habitat and engaging in public education. Therefore, I suggest developing a “Monarchs in the Parks” certification program through the NRPA to multiply outreach efforts and habitat creation to engage parks in taking action to achieve conservation outcomes in a purposeful way.

## VI. References

- Advantage Oakland. 2009. *Green Infrastructure Vision: Oakland County, Michigan*. Retrieved from: [http://www.advantageoakland.com/ResearchPortal/Documents/Maps/gi\\_poster.pdf](http://www.advantageoakland.com/ResearchPortal/Documents/Maps/gi_poster.pdf)
- Albert, D.A., Cohen, J.G., Kost, M., Slaughter, B.S., & Enander, H. (2008) *Distribution Maps of Michigan's of Michigan Natural Communities*. Report No. 2008-01. Lansing, MI: Michigan Natural Features Inventory. Retrieved from: [http://mnfi.anr.msu.edu/reports/2008-01-Distribution Maps of Michigan's Natural Communities.pdf](http://mnfi.anr.msu.edu/reports/2008-01-Distribution%20Maps%20of%20Michigan's%20Natural%20Communities.pdf)
- Archer, D. & Wearing, S. 2002. Interpretation and marketing as management tools in national parks: Insights for Australia. *Journal of Leisure Property*, Vol. 2, No. 1, 29-39.
- Billgren, C. & Holmen, H. 2008. Approaching reality: Comparing stakeholder analysis and cultural theory in the context of natural resource management. *Land Use Policy*, 25, 550-562.
- Brower, L.P., Taylor, O.R., Williams, E.H., Slayback, D.A., Zubieta, R.R., and Ramirez, M.I. 2012. Decline of monarch butterflies overwintering in Mexico: is the migratory phenomenon at risk? *Insect Conservation and Diversity*, 5, 95–100.
- Bryson, J. M. (1995). *Strategic Planning for Public and Nonprofit Organizations*. San Francisco, CA: Jossey-Bass Publishers.
- Burkardt, N. & Ponds, P.D. 2006. Using Role Analysis to Plan for Stakeholder Involvement: A Wyoming Case Study. *Wildlife Society Bulletin*, Vol. 34, No. 5, 1306-1313.
- Chevalier, J. (2001, June). *Stakeholder Analysis and Natural Resource Management*. Carleton University, Ottawa. Retrieved from: <http://www1.worldbank.org/publicsector/politiceconomy/November3Seminar/Stakeholder%20Readings/SA-Chevalier.pdf>
- Church, S.P. (2015). Exploring Green Streets and rain gardens as instances of small scale nature and environmental learning tools. *Landscape and Urban Planning*, 134, 229-240.
- Comer, P.J., Albert, D.A., Scrimger, T. Leibfried, D. Schuen, D. & Jones, H. (1993). *Historical Wetlands of Michigan's Coastal Zone and Southern Lakeplain*. CZM Project 309-S. Lansing, MI: Michigan Natural Features Inventory. Retrieved from: <http://www.gpo.gov/fdsys/pkg/CZIC-qh87-3-h54-1993/html/CZIC-qh87-3-h54-1993.htm>
- Commission for Environmental Cooperation. (2008, June). *North American Monarch Conservation Plan* [Project Report]. Montreal, Canada: Commission for Environmental Cooperation.

- Dolesh, R. (2014, March 1). Can Parks Help Save the Monarch? *Parks & Recreation*, National Recreation and Parks Association, Ashburn, VA. 54-59
- De Lopez, T.T. 2001. Stakeholder Management for Conservation Projects: A Case Study of Ream National Park, Cambodia. *Environmental Management*, Vol. 28, No. 1, 47-60.
- Diffendorfer, J.E., Loomis, J.B., Ries, L., Oberhauser, K., Lopez-Hoffman, L., Semmens, D., Semmens, B., Butterfield, B., Bagstad, K., Goldstein, J., Wiederholt, R., Mattsson, B. & Thogmartin, W.E. 2013. National Valuation of monarch butterflies indicates an untapped potential for incentive-based conservation. *Conservation Letters*, 7(3), 253–262.
- Freeman, R.E. 1984. *Strategic Management – A Stakeholder Approach*. Massachusetts: Pittman Publishing Inc.
- Grimble, R. and K. Wellard. 1997. Stakeholder Methodologies in Natural Resource Management: A Review of Principles, Contexts, Experiences and Opportunities. *Agricultural Systems*, Vol. 55, No. 2, 173-193.
- Hage, M., Leroy, P., Petersen, A.C. 2009. Stakeholder participation in environmental knowledge production. *Futures*, 42, 254–264.
- Hansen, R. (2011). Monarch Butterfly (*Danaus plexippus*) on New England Aster [Online Image]. USFWS Image Library Midwest Region 3. Retrieved from <http://digitalmedia.fws.gov/cdm/singleitem/collection/natdiglib/id/11724/rec/13>
- Kaplowitz, M.D. & Witter, S.G. 2008. Agricultural and residential stakeholder input for watershed management in a mid-Michigan watershed. *Landscape and Urban Planning*, 84, 20-27.
- Kontogianni, A., Tziritis, & Skourtos, M. 2005. Bottom-up Environmental Decision Making Taken Seriously: Integrating Stakeholder Perceptions into Scenarios of Environmental Change. *Human Ecology Review*, Vol. 12, No.2, 87-95.
- Latin America and Caribbean Regional Health Sector Reform Initiative. (2000, September). *Policy Toolkit for Strengthening Health Sector Reform*. Retrieved from: <http://info.worldbank.org/etools/docs/library/48545/RD1.PDF.pdf>
- Lute, M.I. & Gore, M.L. 2014. Knowledge and Power in Wildlife Management. *The Journal of Wildlife Management*, 78(6), 1060-1068.
- Luyet, V., Schlaepfer, R., Parlange, M.B., & Buttler, A. 2010. A framework to implement Stakeholder participation in environmental projects. *Journal of Environmental Management*, 111, 213-219.
- Michigan Natural Features Inventory. 2015. *Michigan's Special Animals*. East Lansing, MI. Retrieved from: <http://mnfi.anr.msu.edu/data/specialanimals.cfm>

- Michigan State Senate. (2013). *Michigan Population by County, 1990-2013*. Retrieved from: <http://www.senate.michigan.gov/sfa/economics/MichiganPopulationByCounty.PDF>
- Oakland County Parks and Recreation. (2013). *Five-Year Parks and Recreation Master Plan 2013-2017*. Waterford, MI. Retrieved from: <http://www.destinationoakland.com/planning/organization/Pages/Recreation-plan.aspx>
- Overseas Development Administration. (1995). *Guidance note on how to do stakeholder analysis of aid projects and programmes*. Overseas Development Administration, Social Development Department. Retrieved from: [http://www.sswm.info/sites/default/files/reference\\_attachments/ODA%201995%20Guidance%20Note%20on%20how%20to%20do%20a%20Stakeholder%20Analysis.pdf](http://www.sswm.info/sites/default/files/reference_attachments/ODA%201995%20Guidance%20Note%20on%20how%20to%20do%20a%20Stakeholder%20Analysis.pdf)
- Pleasants, J.M. & Oberhauser, K.S. 2013. Milkweed loss in agricultural fields because of herbicide use: effect on the monarch butterfly population. *Insect Conservation and Diversity*, 6, 135–144.
- Rastogi, A., Badola, R., Hussain S. A., Hickey, G.M. 2010. Assessing the utility of stakeholder analysis to Protected Areas management: The case of Corbett National Park in India. *Biological Conservation*, 143, 2956-2964.
- Reed, M. 2008. Stakeholder participation for environmental management: A literature review. *Biological Conservation*, 141, 2417-2431.
- Reed, M., Graves, A., Dandy, N., Posthumus, H., Hubacek, K., Morris, J., Prell, C., Quinn, C. and L. Stringer. 2009. Who's in and why? A typology of stakeholder analysis methods for natural resource management. *Journal of Environmental Management*, Vol. 90, 1933-1949.
- Ryan, R.L., Kaplan, R., Grese, R.E. 2001. Predicting Volunteer Commitment in Environmental Stewardship Programmes. *Journal of Environmental Planning and Management*, 44(5), 629-648.
- Schumann, H. 2002. Sense and nonsense about surveys. *Contexts*, May, 1: 40-47
- Selby, G. (Date Unknown). Powesheik Skipperling (*Oarisma powesheik*) butterfly at Prairie Coteau SNA, Pipestone County, Minnesota. [Online Image] Retrieved from <http://www.fws.gov/Midwest/endangered/insects/posk/index.html>
- SEMCOG. (2012). *Southeast Michigan 2040 Forecast Summary*. Retrieved from: <http://library.semco.org/InmagicGenie/DocumentFolder/2040ForecastSummary.3-12.pdf>
- Taylor, Chip (2013, January 28). *Monarch Population Status*. [Blog Entry]. Retrieved from: <http://monarchwatch.org/blog/2014/01/monarch-population-status-20/>

- The White House. (2014, June 20). *Fact Sheet: The Economic Challenge Posed by Declining Pollinator Populations*. Retrieved from: <https://www.whitehouse.gov/the-press-office/2014/06/20/fact-sheet-economic-challenge-posed-declining-pollinator-populations>
- U.S. Fish and Wildlife Service. (2014, December 29). *Service Initiates Status Review of Monarch Butterfly under the Endangered Species Act*. Retrieved from: <http://www.fws.gov/midwest/news/764.html>
- U.S. Fish and Wildlife Service. (2015, February 9). *U.S. Fish and Wildlife Service Teams with Conservation Partners to Launch Campaign to Save Beleaguered Monarch Butterfly, Engage Millions of Americans*. Retrieved from: <http://www.fws.gov/news/ShowNews.cfm?ID=6F984BBC-D85B-FEE8-4C58EF75037F8B59>.
- Varvasovszky, Z. & Brugha, R. 2000. How to do (or not to do)...A stakeholder analysis. *Health Policy and Planning*, 15(3), 338-345.
- Whittinghill, L.J., Rowe, B.D., Andresen, J.A., & Cregg, B.M. Comparison of stormwater runoff from sedum, native prairie, and vegetable producing green roofs. *Urban Ecosystems*, Vol. 18, Issue 1, 13–29.
- Wikipedia (2015). Map of Michigan with Oakland County Highlighted [Online Image]. Oakland County, MI Wikipedia webpage. Retrieved from: [http://en.wikipedia.org/wiki/Oakland\\_County,\\_Michigan](http://en.wikipedia.org/wiki/Oakland_County,_Michigan)
- World Wildlife Fund. (March 14, 2013). *Monarch Butterfly Survey Indicates Lowest Numbers in 20 Years*. [Blog Entry] Retrieved from: <https://worldwildlife.org/stories/monarch-butterfly-survey-indicates-lowest-numbers-in-20-years>

## Appendix A. Pollinator Conservation Resource List

### National

- Bee City USA: <http://www.beecityusa.org/>
- Bumble Bee Watch: <http://bumblebeewatch.org/>
- Journey North: <http://www.learner.org/inorth/>
- Make Way for Monarchs: <http://makewayformonarchs.org/i/>
- Monarch Joint Venture: <http://www.monarchjointventure.org/>
- Monarch Lab: <http://monarchlab.org/>
- Monarch Teacher Network: <http://www.eirc.org/programs-services/global-connection/monarch-teacher-network/>
- Monarch Watch: <http://monarchwatch.org/>
- North American Butterfly Association: <http://naba.org/>
- Pollinator Partnership: <http://www.pollinator.org/>
- The Xerces Society for Invertebrate Conservation: <http://www.xerces.org/>
- Wild Ones: <http://www.wildones.org/>

### Michigan

- Michigan Butterfly Network: <http://michiganbutterfly.org/>
- Michigan Natural Features Inventory: <http://mnfi.anr.msu.edu/>
- Michigan Butterfly Farm: <http://mybutterflyplants.com/>

### Local

- North Oakland Wild Ones Chapter: <http://northoakland.wildones.org/>
- Southeast Michigan Wild Ones Chapter: <http://www.wildones.org/chapters/semich/>
- Southeast Michigan Butterfly Association: <http://www.sembabutterfly.org/>
- Monarch Watch Specialists (local):
  - Debbie Jackson: [debbieamj@gmail.com](mailto:debbieamj@gmail.com)
  - Brenda Diedzic: [HappyButterflying@yahoo.com](mailto:HappyButterflying@yahoo.com)



## Appendix B. IRB Approved Introductory Email and Interview Guide

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Greetings,

I am an Oakland County Parks volunteer and graduate student in Environmental Management. I am contacting you in regards to a research project involving Duke University and Oakland County Parks and Recreation. It is a stakeholder analysis of individuals and organizations involved with conservation in the park system and region. We are interested in your thoughts and experiences as they relate to land management and/or education outreach efforts around Monarch butterflies and other pollinator conservation practices. The goal of the research is to understand how to best approach the conservation of Monarch butterflies and other pollinators in the park system.

The interview could last 15 minutes to 45 minutes. Your participation is voluntary and you may contact the researcher at any time to request that your data be deleted. Although none of the questions will ask for sensitive information, you will be asked to provide your name, work title and the name of your organization, email and phone number. This information will be kept to keep track of responses, and for contacting you in the future should it be necessary. Please note that your responses may be shared among researchers and shared with identifying information for academic purposes, including in research articles and presentations. Only your title and organization will be used in these reports, not your personal information such as name, email address or phone number. Contact Dr. Nicolette Cagle at [nicolette.cagle@duke.edu](mailto:nicolette.cagle@duke.edu) with any questions or concerns. For questions about your rights as a participant in this research, please contact the Duke University Institutional Review Board at 919-684-3030 or [ors-info@duke.edu](mailto:ors-info@duke.edu). If you would like to participate, please respond to this email to set up a mutually agreed upon time for the interview. Thank you for your time and consideration!

Sincerely,

Lisa Appel

MEM Candidate (2015) / Duke Environmental Leadership Program

[lisa.appel@duke.edu](mailto:lisa.appel@duke.edu)

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### **Internal Stakeholder Interview Questions:**

1. What are your duties/responsibilities within your organization?
2. Among your duties/responsibilities, what are your highest priorities within your position?
3. Do you see yourself in education/outreach/management/planning/business development or natural resource management, or maintenance, which category would you place yourself in?
4. Are you familiar or involved with best-management practices for pollinator conservation?
  - a. They could include:
    - No-mow zones
    - Rain gardens/bio-swales
    - Native plantings
    - Butterfly gardens
    - Invasive species removal
    - Mowing/burning schedules
    - Herbicide application
5. If so, please describe how? Do you think they are important practices?
6. Are you familiar with the need for Monarch butterfly conservation?
7. Do you know of education and outreach programs at OC parks that include educating visitors about pollinator and Monarch butterfly conservation? An example would be an outreach program at a nature center.
8. Have you heard of pollinator or Monarch conservation efforts done by other agencies or groups? What do you think about other programs you may have heard about?
9. In your opinion, should OC Parks have a Monarch butterfly conservation program? Why or why not?
10. What new opportunities do you see for pollinator-friendly conservation practices (that includes helping Monarch butterflies) within OC Parks?
11. In your opinion, what are the benefits of a conservation program specific to Monarch butterflies within OC Parks?
12. In your opinion, what are the biggest barriers for pollinator conservation in OC Parks?
13. On a scale of 1-7, where 1 means not at all interested and 7 means very interested, how interested are you personally in Monarch Butterfly conservation efforts?
14. What can you do in your current position to support monarch conservation at OC Parks?
15. Do you have other comments you would like to share about conservation and land management practices at OC Parks?

### **External Stakeholder Interview Questions:**

1. Are you familiar with Monarch Butterfly and pollinator Conservation?
2. Do you think Monarch butterfly and pollinator conservation is important?
3. On a scale of 1-7, where 1 means not at all interested and 7 means very interested, how interested are you personally in Monarch butterfly conservation efforts?
4. In your opinion, should Oakland County Parks have a Monarch butterfly conservation program? Why or why not?
5. Specifically, what role would you like them to play?

6. What opportunities do you see for Monarch butterfly conservation within Oakland County parks or a county park system in general? Should they focus on land management and creating more habitat or education and awareness?
7. What barriers for do you see for Monarch butterfly conservation or pollinator conservation at a county park level?
8. Are you currently involved with Oakland County Parks?
9. If so, please describe your relationship with Oakland County Parks?
10. Do you have other comments you would like to share about pollinator and Monarch butterfly conservation and land management practices at Oakland County Parks?

## Appendix C. Communications Strategy Matrix

Stakeholder	Message	Communications Platform	Metric
<b>OCPR Commission</b>  <b>Local Communities</b>  <b>ITC Holdings, Inc./corporate habitat partners</b>  <b>Media/press coverage</b>	<p>- OCPR has a comprehensive two-year campaign to conserve Monarch butterflies and other pollinators through education and management.</p> <p>- Local communities can support the Monarch conservation effort by using land management best-practices, increasing now-mow zones, planting Milkweed and nectar plants, and providing signage at butterfly gardens to educate the public.</p> <p>- You can document your habitat at the Monarch Joint Venture website or through Waystation certification.</p>	<p>-Quarterly newsletter – <i>Communication Connections</i> sent to township, villages and elected officials</p> <p>-Interdepartmental County Government communications</p> <p>-Press releases</p> <p>-OCPR Annual report</p>	<p>-Number of local government agencies interested in duplicating OCPR conservation actions</p> <p>-An increase in resources directed towards natural resource management</p> <p>-Number of newsletter and magazine articles related to pollinator conservation</p>
<b>Park Supervisors</b>  <b>OCPR Staff</b>	<p>-OCPR conserves and restores habitat for Monarch butterflies and pollinators. You play an important role in managing natural resources at the park.</p> <p>-Appropriate management techniques are important for pollinator conservation, especially using pesticides and mowing at parks.</p> <p>-Native Milkweed and wildflowers in No-Mow zones provide important habitat for Monarch butterflies.</p> <p>-Native plantings and restoration projects support the local food web and pollinators.</p>	<p>-Training for maintenance staff</p> <p>-Weekly employee newsletter</p> <p>- Staff meetings</p>	<p>- Number of appropriate staff trained on pollinator best-management practices</p> <p>-Number of staff participating in pollinator management activities through their role in the organization</p> <p>-Number of staff who can list examples of pollinator management conducted at parks to promote activities</p>
<b>General Public</b>  <b>Informal partners</b>  <b>Media/press coverage</b>	<p>-OCPR conserves and restores habitat for Monarch butterflies and pollinators.</p> <p>-Discover how you can help Monarch butterflies at your own home.</p>	<p>-Website</p> <p>-Emails to user groups</p> <p>-Press releases</p> <p>-Flyers</p>	<p>- Number of people attending educational programs</p> <p>-Number of people who build butterfly gardens in their home landscape</p>

	<ul style="list-style-type: none"> <li>-Learn to monitor butterflies using citizen science at Oakland County Parks.</li> <li>-Join us to learn about the miraculous migration of Monarch butterflies.</li> <li>-Teach your children about the wonder of nature and science.</li> <li>-Native plantings and restoration projects support the local food web and pollinators.</li> </ul> <p><i>Provide detail about pollinator management and rare insect species on Destination Oakland website</i></p>	<ul style="list-style-type: none"> <li>- Kiosks at parks</li> <li>- Wayside signage</li> <li>-Brochures, i.e. Butterfly Checklist</li> <li>-Social Media, i.e. Facebook page YouTube Channel</li> </ul>	<ul style="list-style-type: none"> <li>-Number of people participating in monitoring programs</li> <li>-Number of people who visit natural resource management section of the website</li> <li>-Number of emails sent to the list-serve related to pollinator management</li> <li>-Number of social media posts and videos shared to promote activities and share successes</li> </ul>
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